CURIOSITY AND
POWERFUL LEARNING

MODELS OF PRACTICE

3. WHOLE CLASS TEACHING MODEL

4. CONCEPT ATTAINMENT MODEL

DAVID HOPKINS

3&4

McREL INTERNATIONAL

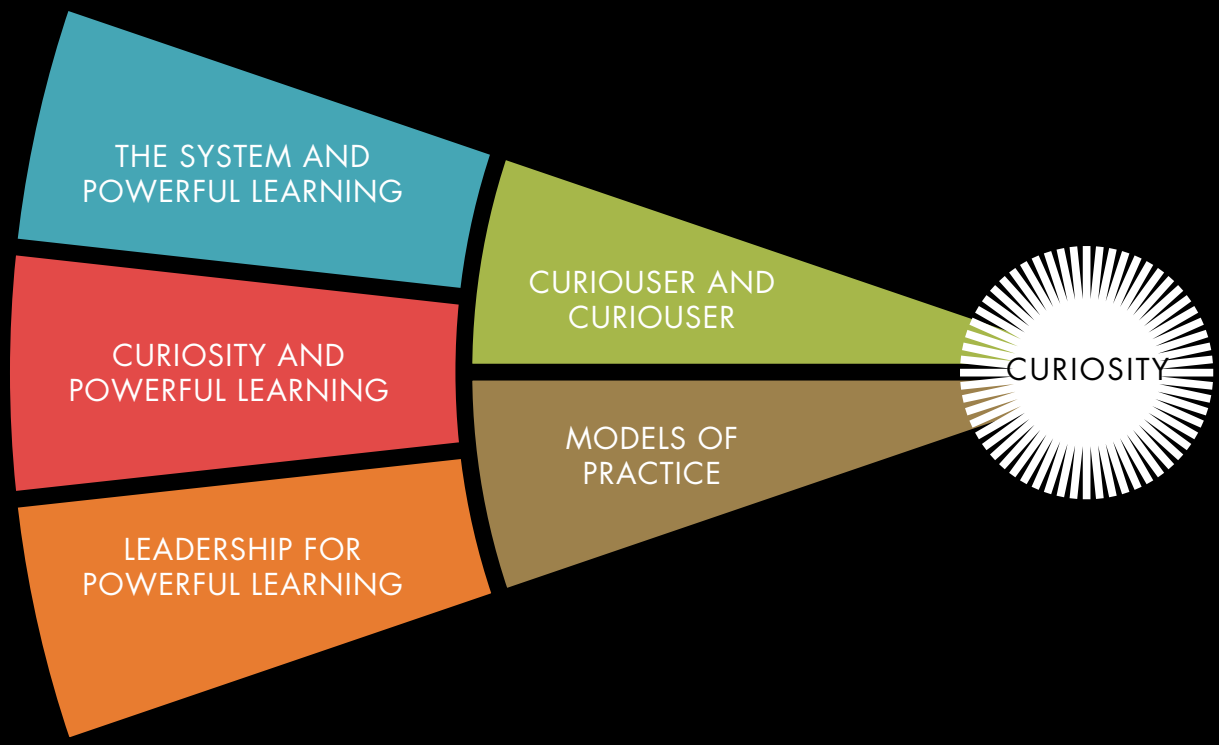
THE CURIOSITY AND POWERFUL LEARNING SERIES

The Curiosity and Powerful Learning manuals are designed for teachers and for school and system leaders who are embarked on a school improvement journey. The manuals describe how schools can lift student learning. The steps are drawn from practical experience, tested and refined in schools over time.

Three manuals are at the core of the series – *The System and Powerful Learning*, *Curiosity and Powerful Learning*, and *Leadership for Powerful Learning*. Together they explain how powerful learning is made real for our students through purposeful, specific changes in whole school culture, classroom culture, leadership, and teaching practice.

The series includes *Curiouser and Curiouser* and *Models of Practice* manuals which concentrate on precision in teaching practice. They stand as references for improving, planning, and monitoring professional practice, assisting us to get to the heart of the learning enterprise.

The manuals recognise that schools differ, and must differ in responding to their communities. Diversity among schools is cause for celebration, as is consistently high student learning outcomes in all schools. Each manual emphasises the collective endeavour essential to achieving curiosity driven powerful learning. Teachers work together, students become more adept at using curiosity as a learning resource, leaders communicate purpose and direction. We all monitor outcomes and adapt as we go. We are all professional learners.



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TEACHING FOR POWERFUL LEARNING

We know that powerful is happening when our students are performing well academically *and* when they progressively improve their capacity to manage their own learning. Both outcomes guide our teaching practice. They are at the heart of the three *Models of Practice* manuals in the The Curiosity and Powerful Learning series.

Each manual presents two models of practice.

The manual	The models of practice
Models of Practice – Manual 1	Cooperative group work Synectics
Models of Practice – Manual 2	Whole class teaching Concept attainment
Models of Practice – Manual 3	Inductive teaching Mnemonics

Before embarking on a study of the models of practice it is important to set the scene for them. Like the other two Models of Practice manuals, this manual begins by explaining the purposes of models of practice and the evidence they rest on.

Incorporating a model of practice into your teaching repertoire is a shared professional task. We do it with the active support of our colleagues. It is a task that schools prioritise. They do so through structured opportunities for continuous professional learning, and by maintaining a school culture that promotes the conditions for practice improvement.

Each Models of Practice manual includes the Self-Assessment Tool: Classroom and School Conditions (pages xx-xx). The tool assists schools and teachers to monitor conditions that advance or impede great teaching and powerful learning.

USING THIS MANUAL

The *Models of Practice* manuals are practitioner guides. They are written with practical guidance in mind. For each model of teaching you will find:

- a detailed description of the model's key features and its syntax (patterns, phases, and guidelines)
- peer coaching guides for the models, designed to facilitate planning, communication, and sharing of ideas between teachers.

USING THE PEER COACHING GUIDES

The peer coaching guides facilitate planning and communication between teachers who observe one another and profit from the observational experience. The peer coaching guides support teachers to share ideas. Peer coaching is underpinned by six principles.

PRINCIPLES FOR PEER COACHING	
PRINCIPLE 1	Peer coaching builds communities of teachers who continuously engage in the study of their craft.
PRINCIPLE 2	Peer coaching partners increase their ability to teach students how to learn and to analyse transactions between teacher and student.
PRINCIPLE 3	Peer coaching provides a safe environment in which to learn and perfect new teaching models, experiment with variations of strategies, teach students new skills, and examine results. *(Peer coaching eliminates hierarchical power structures.)*
PRINCIPLE 4	In peer coaching, teachers learn from one another as they plan teaching (instruction), develop support materials, watch one another work with students, and think about how their behaviour influences students' learning.
PRINCIPLE 5	The primary function of peer coaching partners is to learn by observing and helping colleagues by providing information about student responses. *(The purpose of peer coaching is not to give expert advice).*
PRINCIPLE 6	Peer coaching teams are committed to collecting data – they plan: – how they will monitor the implementation of new teaching and learning strategies – how they will determine the impact of each strategy on their students.

The peer coaching guides assist teachers to plan a teaching episode and to focus observation on key features of each model of practice. There are four steps in the peer coaching process.

FOUR STEPS IN THE PEER COACHING PROCESS			
Step 1	**Step 2**	**Step 3**	**Step 4**
Teachers form a partnership to study student responses, and to plan how to help students learn more effectively.	The teaching peer prepares the peer observer by completing the entries in the Peer Coaching Guide: Part 1 – Preparation for Observation.	The peer observer completes the Peer Coaching Guide: Part 2 – Observation Checklist. *Step 3 is completed in about five minutes.*	The peer observer communicates the result to the teaching peer.

WHAT'S IN THIS MANUAL?

FRAMEWORKS FOR TEACHING, LEARNING & MODELS OF PRACTICE

Two goals lied at the heart of curiosity and powerful learning:

– lifting our students' academic achievement
– extending their learning capability.

We can accomplish both goals if we teach our students how to learn at the same time as we assist them to acquire curriculum content.

In *Models of Learning – Tools for Teaching* Joyce and colleagues write that teachers have the privilege of creating powerful contexts for learning:

> *Learning experiences are composed of content, process and social climate. As teachers we create for and with our children opportunities to explore and build important areas of knowledge, develop powerful tools for learning, and live in humanising social conditions.*

Skilled teachers seek to integrate curriculum content, teaching and learning strategies, and school culture. When we bring together content, strategies, and culture the effect is to deepen and reinforce our students' self-confidence.

SPEAKING OF TEACHING

Our integrating task frequently meets a significant barrier. The language we use to describe and share our teaching practice is often imprecise, even though we all acknowledge the importance of classroom practice. It is a reality of professional practice that quality teaching and learning is underpinned by explicit frameworks for teaching and learning. That is the purpose of the *Models of Practice* manuals.

This manual introduces Models of Practice by:

– discussing the nature of powerful learning
– describing a framework for thinking about teaching, based on out 'theories of action' approach
– exploring the concept of models of teaching and their relationship to learning
– emphasising the importance of making practice concrete through the use of protocols and reflection.

EXPLORING THE EVIDENCE ABOUT TEACHING AND LEARNING

The *Models of Practice* manuals explicitly draw on a range of evidence about what kinds of teaching practice power student learning. Consequently, at the outset it is useful to explore some of the evidence about effective teaching and learning.

Exploration is the key. In working with teachers, school leaders, system leaders and students over many years I have come realise just how important is the willingness to explore. That exploration has led to this and other manuals in the Curiosity and Powerful Learning series, and this introduction discusses aspects of the work on effective teaching and learning described in those manuals. Earlier work tells us that the evidence on effective teaching can help us become more innovative in creating powerful learning environments for our students.

But research does not offer simple solutions that we follow without question. Research knowledge and specifications of teaching can have many limitations, especially if we adopt them uncritically. The evidence is only useful when we subject it to the discipline of practice through exercising our professional judgement as teachers. As Lawrence Stenhouse observed, the evidence does not stand as

> *… an unqualified recommendation, but rather as a provisional specification claiming no more than to be worth putting to the test of practice. Such proposals claim to be intelligent rather than correct.*

As teachers we accept the responsibility of continuously testing the evidence and adjusting our practice based on what we learn about what works best for our students in our school. This way of valuing our work is part of our professional identity.

POWERFUL LEARNING

Today we have sophisticated research evidence on how learning occurs and on the ways we can organise learning experiences to make a positive difference for our students.

The purpose of teaching is both to help students to acquire curriculum knowledge, and to assist them to become powerful learners. The trick is to find ways of raising our students attainment levels at the same time as we expand, and make articulate, their repertoire of learning strategies.

The most effective curricular and teaching patterns encourage our students to construct knowledge – to inquire intensively. The result of intense curiosity is to increase out students' capacity to learn and work smarter.

Powerful learning is the ability of learners to respond successfully to two kinds of tasks – the tasks we set them, and the tasks they set themselves. Powerful learning is marked by six observable characteristics.

POWERFUL LEARNING IS PRESENT WHEN OUR STUDENTS …	
integrate prior and new knowledge	think carefully about successes & failures
acquire and use a range of learning skills	evaluate conflicting evidence and think critically
solve problems individually and in groups	accept that learning involves uncertainty and difficulty

Deploying this range of learning strategies is called meta-cognition – the learner's ability to take control over their own learning processes. This means that in every learning context our students are involved in an 'active construction of meaning'. It carries implications for how we manage learning opportunities. Learning is interactional. It occurs only when the learner makes sense of particular experiences in particular contexts. Making sense involves connecting with a student's prior knowledge and experience.

The clear implication is that new learning must relate to, and ultimately fit with, what a student already understands. Learning is a process, and that process produces end results. This interactive view of learning is mirrored on page 7 of this introduction which notes that a teaching strategy can also be a model of learning.

TEACHING AND ACQUIRING SKILLS OF LEARNING

Powerful learning is concerned with teaching and acquiring skills of learning. If we are serious about personalised learning then we need a clear typology of the skills students we want our students to master so they develop their personal effectiveness and employability. These skills fall into three categories.

Functional skills These skills support our students to be active, confident citizens and workers	In most countries, literacy, numeracy, and ICT skills are regarded as priorities. They are frequently taught and assessed in the core subjects of language, mathematics, and ICT.
Thinking and learning skills These skills enable our students to become effective learners	Mastery of thinking and learning skills equips our students to raise their achievement by developing their abilities to: – improve achievement by applying a wide range of learning approaches in different subjects – learn how to learn, with the capability to monitor, evaluate, and change the ways in which they think and learn – become independent learners, knowing how to generate their own ideas, acquire knowledge and transfer their learning to different contexts
Personal skills These skills enhance our students' personal effectiveness	Mastery of personal skills equips our students to manage themselves and to develop and maintain effective social and workplace relationships

This skills framework clarifies *what* skills students should gain. As educators we are responsible for clarifying *how* our students gain those skills. We need to agree on two things in particular – how we:

– embed these skills in teaching and learning – we must teach them well and avoid the too common experience that students' skill development is patchy across schools and the system as a whole
– develop these skills coherently across the curriculum – we must specify them, develop them systematically, and explicitly track their development.

The skills framework is consistent with trends in many countries. For example, the OECD's (2005) Definition and Selection of Competencies (DeSeCo) Project classified into three broad categories the key competencies an individual needs for a successful life.

Interactively use physical and socio-cultural tools
– Use language, symbols, and texts interactively
– Use knowledge and information interactively
– Use technology interactively

Interacting in heterogeneous groups
– Relate well to others
– Co-operate, work in teams
– Manage and resolve conflicts

Acting autonomously
– Act within the big picture
– Form and conduct life plans and personal projects
– Defend and assert rights, interests, limits, and needs

To summarise, greater coherence across the curriculum is created by:
– the clarity of a single skills framework
– better guidance and training on pedagogy.

These are the necessary foundations for ensuring that the essence of personalised learning is available for every student.

A FRAMEWORK FOR THINKING ABOUT TEACHING – THE THEORIES OF ACTION

The central characteristic of effective teachers is their ability to develop students who are both powerful learners and knowledgeable. The framework for teaching proposed below is to suggest a way in which all teachers can do just that.

The framework for thinking about teaching is described in detail in *Curiosity and Powerful Learning*, one of the manuals in the Curiosity and Powerful Learning series. The framework was developed by me and many colleagues during a system-wide school improvement effort in the Northern Metropolitan Region of Melbourne, Australia. (Hopkins, Craig and Munro 2011). The overall approach is described in *The System and Powerful Learning*, another of the Curiosity and Powerful Learning manuals.

THEORIES OF ACTION

The aim was to create a new culture of teaching and learning within our schools, and to raise standards of student attainment and learning. This required devising and implementing strategies that built a common language of instructional practice within the Region. To do this we refined the instructional rounds leadership strategy being adopted at that time across the state of Victoria (City et al. 2009). We worked iteratively, and systematically, from the existing knowledge base of individual teachers to develop Theories of Action. Those Theories of Action, validated by classroom teachers, formed a precise approach that disciplined and deepened the culture of teaching and learning of all teachers in schools throughout the Region.

A Theory of Action is a link between cause and effect:

WHEN we take a particular action
THEN we expect that action to have specific effects.

A Theory of Action connects the actions of teachers with the consequences of their actions – the learning and achievement of their students. The overarching Theory of Action is:

WHEN teachers, strongly supported by their schools, explicitly and consistently incorporate the Theories of Action in their teaching
THEN our students' curiosity enriches their learning skills and their spirit of inquiry.

As is noted in *Curiosity and Powerful Learning* (page 6), we learned five important lessons from our deepening experience with instructional rounds and the development of Theories of Action.

FIVE LESSONS FROM INSTRUCTIONAL ROUNDS THAT GUIDE OUR POWERFUL LEARNING WORK

1. Similar Theories of Action are defined and implemented in most schools, despite differences in schooling phases and contexts.
2. To impact on student learning in a sustained way, it's necessary to integrate all Theories of Action into a teacher's professional repertoire. It is not a 'pick and mix' approach.
3. All Theories of Action are characterised by teaching approaches with *inquiry* at their centre.
4. Some Theories of Action are about the whole school, and some are about the individual practice of teachers.
5. All Theories of Action have a high level of empirical support in the research literature. (We used John Hattie's 2009 book, *Visible Learning*, as our key source and 'effect size' as the metric for evaluation.)

The collaborative work of participating teachers and school leaders provided the substance for ten Theories of Action. That collaborative endeavour was driven by their desire to find even more powerful ways for their students to learn and to become successful. Our ten Theories of Action are described in detail in *Curiosity and Powerful Learning*. In summary they are as follows.

FOUR WHOLE SCHOOL THEORIES OF ACTION

Four Whole School Theories of Action support teaching for curiosity and achievement. They are fundamental in every school and for all teaching practice. They create a reliable, consistent, supportive environment for implementing the six Theories of Action for Teachers.

PRIORITISE HIGH EXPECTATIONS & AUTHENTIC RELATIONSHIPS

WHEN schools and teachers prioritise high expectations and authentic relationships
THEN curiosity will flourish.

EMPHASISE INQUIRY FOCUSED TEACHING

WHEN inquiry is a defining characteristic of a school's culture
THEN the level of student achievement and curiosity will increase.

ADOPT CONSISTENT TEACHING PROTOCOLS

WHEN we adopt consistent teaching protocols
THEN student behaviour, engagement, learning, and curiosity will be enhanced.

ADOPT CONSISTENT LEARNING PROTOCOLS

WHEN we adopt consistent learning protocols in all classes
THEN all students will experience an enhanced capacity to learn, and to develop skills, confidence, and curiosity.

SIX THEORIES OF ACTION FOR TEACHERS

These Theories of Action are about teaching. They form the core teaching protocols for the whole school.

HARNESS LEARNING INTENTIONS, NARRATIVE & PACE

WHEN we harness learning intentions, narrative, and pace so students are more secure about their learning, and more willing to take risks
THEN achievement and understanding will increase and curiosity will be enhanced.

SET CHALLENGING LEARNING TASKS

WHEN learning tasks are purposeful, clearly defined, differentiated, and challenging
THEN all students will experience powerful, progressive, and precise learning.

FRAME HIGHER ORDER QUESTIONS

WHEN we systematically employ higher order questioning
THEN levels of student understanding will deepen and levels of achievement will increase.

CONNECT FEEDBACK TO DATA

WHEN we connect feedback to data about student actions and performances
THEN behaviour will be more positive, progress will accelerate, and curiosity will be enhanced.

COMMIT TO ASSESSMENT FOR LEARNING

WHEN we commit to peer assessment, and assessment for learning
THEN student engagement, learning, and achievement will accelerate.

IMPLEMENT COOPERATIVE GROUPS

WHEN we implement cooperative group structures and techniques to mediate between whole class instruction and students carrying out tasks
THEN the academic performance of the whole class will increase.

LINKING THEORIES OF ACTION WITH MODELS OF PRACTICE

There is an important distinction between teaching tactics and teaching strategies.

In many ways the Theories of Action for Teachers are tactics – teacher behaviours that have a direct and precise impact on student learning. They are specific actions that respond to specific classroom circumstances. For example, framing a learning intention sets the context for learning, questioning encourages reflection and problem solving, group work establishes the social conditions for inquiry. Tactics are the core repertoire of teaching skills.

The term 'models of practice' is used for teaching strategies that describe the approach for an entire lesson or curriculum unit. Whole Class Teaching is the best known model of practice.

The good news is that in different combinations the six Theories of Action for Teachers comprise the essential building blocks for the Whole Class Teaching model and other models of practice. This introduction lays a foundation for the six models of practice described in the *Models of Practice* manuals.

MODELS OF PRACTICE ARE MODELS OF LEARNING

TOOLS FOR TEACHING

Underlying the concept of a Model of Practice is the belief that the teacher's task is more than simply to 'teach'. The task encompasses creating powerful contexts for learning. That broader scope for professional practice leads us to the proposition that a good teaching strategy can also be a powerful learning strategy. As Joyce and colleagues put it:

> *Our toolbox is the models of teaching, actually models for learning, that simultaneously define the nature of the content, the learning strategies, and the arrangements for social interaction that create the learning environments of our students ... Through the selection of appropriate models, content can become conceptual rather than particular, the process can become constructive inquiry instead of passive reception, and the social climate can become expansive not restrictive. Our choices depend on the range of our active teaching repertoire and our efforts to expand it by developing new models and studying those developed by others.*

MODELS OF TEACHING ARE ALSO MODELS OF LEARNING

How we teach has a large impact on our students' abilities to educate themselves. Each model of teaching has a core purpose that relates how to organise teaching with ways of learning. The table shows examples of this relationship for the six models of teaching presented in the *Models of Practice* manuals.

EXAMPLES OF THE RELATIONSHIP BETWEEN MODELS OF TEACHING AND WAYS OF LEARNING

Model of teaching	Learning skill	Where do I find it?
Cooperative group work	Working productively with others on tasks requiring higher order thinking	*Model of Practice – Manual 1*
Synectics	Using metaphors to stimulate creative thinking and aid memory	
Whole class teaching	Extracting information and concepts from lectures and presentations	*Model of Practice – Manual 2*
Concept attainment	Grasping and shaping concepts	
Inductive teaching	Building hypotheses and theories through classification	*Model of Practice – Manual 3*
Mnemonics	Organising material in ways that aids recall of key ideas and examples	

IMAGINE A CLASSROOM

Imagine a classroom where the learning environment offers a variety of models of teaching that accomplish a range of curriculum goals, and help students increase their competence as learners.

It is a classroom that Joyce and colleagues describe clearly. The learning environment has seven features that we can both imagine and work to make real.

Bruce Joyce developed this approach in his pioneering work *Models of Teaching*, first published in 1972 and now in its ninth edition. Joyce describes and analyses more than 30 models of teaching – each with their own 'syntax', phases and guidelines. Each model is designed with two objectives in mind:

- to bring about particular kinds of learning
- to help students become more effective learners.

When we use models of teaching to meet these objectives they work as:

- part of an overall strategy for enhancing teacher professionalism
- influential tools for personalising learning.

Models of teaching simultaneously define:

- the nature of the content
- the learning strategies
- the arrangements for social interaction that create the learning environments of students.

In such classrooms the students learn models for memorising information, how to attain concepts and how to invent them.

They practise building hypotheses and theories and use the tools of science to test them.

They learn how to extract information and ideas from lectures and presentations, how to study social issues and how to analyse their own social values.

These students also know how to profit from training and how to train themselves in athletics, performing arts, mathematics and social skills.

They know how to make their writing and problem solving more lucid and creative.

Perhaps most importantly, they know how to take initiative in planning personal study, and they know how to work with others to initiate and carry out cooperative tasks.

As students' master information and skills, the result of each learning experience is not only the content they learn, but also the greater ability they acquire to approach future learning tasks with confidence and to create increasingly effective learning environments for themselves.

PROTOCOLS AND REFLECTION AS PART OF PROFESSIONAL PRACTICE

On page 3 it's observed that specifications for teaching – including Theories of Action and models of practice – are only useful when we subject them to the discipline of practice through exercising our professional judgement. Very often we run into difficulty on the matter of professional judgement, as we explain on page 4 of *Curiosity and Powerful Learning*:

> City and colleagues (2009) note, teaching is often characterised by an individualism in which the person and their teaching practice are intertwined. This perspective leads to the proposition that 'my teaching practice defines who I am as a person.'
>
> Yet other professions share a common practice and open it to public scrutiny. This is a helpful perspective for teachers because it leads to a different proposition: 'my teaching practice is an instrument for expressing who I am as a professional.'
>
> City and colleagues adopt a precise definition of teaching practice:
>
> > *We mean a set of protocols and processes for observing, analyzing, discussing and understanding instruction that can be used to improve student learning at scale. The practice works because it creates a common discipline and focus among practitioners with a common purpose and set of problems.*
>
> Seen like this, practice is a way for teachers to express their current understanding of their work, their knowledge about their work, and their beliefs about what makes the work important. All these things change because a teacher's professional knowledge, skill, expertise, and understanding of their work are always expanding.

These perspectives lead us to emphasise the use of protocols, both with the Theories of Action and the Models of Practice.

They also lead us to emphasise teacher reflection. Experience suggests that critical, systematic reflection is a necessary condition for quality teaching. Reflection assists us to continue developing a mastery of our chosen craft. Through reflection we harmonise, integrate, and transcend the necessary classroom management skills, and the personal aspects of our teaching practice. Reflection enables us to shape a strategy that has meaning for our students.

BALANCING WHOLE CLASS, SMALL GROUP, AND INDIVIDUAL LEARNING

There is ongoing debate about the appropriate balance between whole class, small group, and individual activities. Working out that balance depends on what works best for our students. It is the models of learning and teaching we choose that have the greatest direct effect on student achievement. Efficient models of teaching make two assumptions:

- that we will organise the whole class to pursue common learning objectives
- individual differences in achievement are comfortably met within our organisation of the whole class.

Creators of efficient and effective teaching models have an overall educational scheme in mind – the whole class, small group work and individual work are part of that scheme.

As Bruce Joyce elegantly phrased it, 'the operational repertoire of the teacher is the critical element in the calculus of effects.'

STARTING WITH SELF-ASSESSMENT

The context and conditions that support effective teaching and learning underpin the *Models of Practice* manuals.

The Self-Assessment Tool: Classroom and School Conditions will assist you to establish an understanding of the classroom and school conditions in your current context.

SELF-ASSESSMENT TOOL: CLASSROOM AND SCHOOL CONDITIONS

PART 1: THE CLASSROOM CONDITIONS

Part 1 of the Self-Assessment Tool poses 24 statements about teacher practice in classrooms. Use the rating scale to indicate how far these statements match *your own perception* of teacher practice in your school – in other words, your *personal view* of it.

1. AUTHENTIC RELATIONSHIPS

Item		Rarely	Sometimes	Often	Nearly always
1.1	Teachers demonstrate positive regard for all pupils				
1.2	Teachers conduct their relationships in the classroom in ways that demonstrate consistency and fairness and build trust				
1.3	Teachers understand and show that communication with pupils involves listening as much as speaking				
1.4	Teachers make their classrooms places where pupils can safely experiment with behaviours involving choice, risk-taking, and personal responsibility				

2. BOUNDARIES AND EXPECTATIONS

Item		Rarely	Sometimes	Often	Nearly always
2.1	Teachers establish clear boundaries to, and expectations of, student behaviour				
2.2	Teachers use a system of rewards and sanctions that: – emphasises expectations – promotes student self-esteem and self-discipline				
2.3	Teachers use active management strategies to create and maintain an appropriate classroom environment				
2.4	Teachers show consistency, and flexibility, in responding to students and events				

3. PLANNING FOR TEACHING

Item		Rarely	Sometimes	Often	Nearly always
3.1	Teachers build variety into lesson plans				
3.2	Teachers adjust classroom arrangements in response to student feedback during lessons				
3.3	Teachers employ strategies that enable pupils to find meaning in lesson activities				
3.4	Teachers use homework to reinforce and extend learning				

4. TEACHING REPERTOIRE

Item		Rarely	Sometimes	Often	Nearly always
4.1	Teachers demonstrate a range of classroom management skills in the lessons				
4.2	Teachers employ various teaching strategies or models within their lessons				
4.3	Teachers trial and refine new teaching models as part of their own professional development				
4.4	Teachers reflect on their classroom practice				

5. PEDAGOGIC PARTNERSHIPS

Item		Rarely	Sometimes	Often	Nearly always
5.1	Teachers discuss with each other the nature of teaching strategies and their application to classroom practice and schemes of work				
5.2	Teachers establish specifications or guidelines for new teaching strategies				
5.3	Teachers agree on standards used to access student progress as a result of employing a range of teaching methods				
5.4	Teachers engage in mutual observation and partnership teaching during lessons				

6. REFLECTION ON TEACHING

Item		Rarely	Sometimes	Often	Nearly always
6.1	Teachers use systematically collected classroom-based data in their decision-making				
6.2	Teachers employ effective strategies for reviewing progress and the impact of classroom innovation on student progress				
6.3	Teachers are widely involved in the process of data collection				
6.4	Teachers establish clear ground rules for collecting, controlling, and using their school-based data				

PART 2: THE SCHOOL CONDITIONS

Part 2 of the Self-Assessment Tool poses 24 statements about *your* school. Use the rating scale to indicate how far these statements match *your own perception* of the school – in other words, your *personal view* of it.

7. INQUIRY AND REFLECTION

Item		Rarely	Sometimes	Often	Nearly always
7.1	In this school we talk about the quality of our teaching				
7.2	As a school we review the progress of changes we introduce				
7.3	Teachers make time to review their classroom practice				
7.4	The school takes care over issues of confidentiality				

8. PLANNING

Item		Rarely	Sometimes	Often	Nearly always
8.1	Our long-term aims are reflected in the school's plans				
8.2	In our school the process of planning is more important than the written plan				
8.3	Everyone is fully aware of the school's Priorities for Development				
8.4	In our school we review and modify our plans				

9. INVOLVEMENT

Item		Rarely	Sometimes	Often	Nearly always
9.1	In this school we ask students for their views before we make major changes				
9.2	This school considers parents' views when changes are made to the curriculum				
9.3	Staff work with the school's governing body to decide the school's future directions				
9.4	In our development work we effectively use external support (like advisers and academics)				

10. PROFESSIONAL LEARNING

Item		Rarely	Sometimes	Often	Nearly always
10.1	Professional learning is valued in this school				
10.2	School policies place emphasis on professional learning				
10.3	In this school the classroom is the focus of professional learning				
10.4	The school is organised to provide time for professional learning				

11. COORDINATION

Item		Rarely	Sometimes	Often	Nearly always
11.1	Staff who take on coordination roles are skillful in working with colleagues				
11.2	We get tasks done by working in teams				
11.3	We are kept informed about key decisions				
11.4	We share experiences about improving classroom practice				

12. LEADERSHIP

Item		Rarely	Sometimes	Often	Nearly always
12.1	All staff in the school have a clear vision of where we are going				
12.2	Senior staff delegate difficult and challenging tasks				
12.3	Senior staff take a lead on Priorities for Development				
12.4	Staff are given opportunities to take on leadership roles				

SELF-ASSESSMENT TOOL: ANALYSIS SUMMARY

The Self-Assessment Tool is primarily concerned with assessing and diagnosing a school's classroom conditions. Consequently, the analysis is best undertaken across the whole school rather than an individual basis.

There are 12 sub-scales in the Self-Assessment Tool. Each scale has four items. The analysis needs to be completed by sub-scale rather than item.

A score of 1-4 is given to responses for each item as follows:

- **'Rarely' scores 1**
- **'Sometimes' scores 2**
- **'Often scores 3**
- **'Nearly always' scores 4.**

The scores are totaled for each sub-scale using the summary table below.

The data make most sense if expressed as percentages. When the data are presented in this way it is easy to highlight patterns of responses, particularly when the percentage response for 'often' and ' nearly always' are added together.

CLASSROOM CONDITIONS – SUMMARY

Subscale	Rarely	Sometimes	Often	Nearly always
1. Authentic Relationships				
2. Boundaries and Expectations				
3. Planning for Teaching				
4. Teaching Repertoire				
5. Pedagogic Partnerships				
6. Reflection on Teaching				

SCHOOL CONDITIONS – SUMMARY

Subscale	Rarely	Sometimes	Often	Nearly always
7. Inquiry and Reflection				
8. Planning				
9. Involvement				
10. Professional Learning				
11. Coordination				
12. Leadership				

WHOLE CLASS TEACHING
THE MODEL OF PRACTICE

Whole class teaching is a model of teaching in which the teacher orchestrates students' learning, seeking to improve performance through direct instruction, whole class questioning, discussion and learning activities.

3

DESCRIPTION

The whole class teaching model enables students to efficiently order, absorb, understand and relate different areas of knowledge. Whole class teaching is about talking with students, listening to them and guiding their learning activities. The model:

- enables students to process information
- encourages interaction so students learn from each other and from the teacher
- extend students' repertoire of social skills.

Whole class teaching relies on good lesson and topic planning. It's essential to have:

- a clear set of overarching learning objectives
- a coherent teaching and learning program that pays close attention to the learning objectives.

Whole class teaching progresses like this.

Planning	Before implementing whole class teaching the teacher: – specifies learning objectives – relates the learning and teaching program to the objectives
Talk & demonstration	Through lecture or demonstration, formally present your students with: – a problem – an issue – an area of knowledge – a set of skills.
Inquiry & Questioning	Students develop understanding through: – systematic questioning – disciplined inquiry.
Apply understanding	Students apply their understanding through a series of set tasks.

SELECTING TEACHING STRATEGIES

Whole class teaching works as part of a coherent teaching and learning plan that may include independent study and cooperative group work (described *Models of Practice 1&2*, one of the manuals in this series).

Employing a range of teaching activities influences students' motivation and engagement in their learning. In our learning journey it's likely we have all experienced tedious and repetitive teacher behaviours and activities, such as non-stop teacher presentation, instruction involving taking notes, answering questions from textbooks and recycling information in homework tasks.

Our professional responsibility is to select teaching and learning strategies that produce real learning and grounded understanding. Mixing the palette of teaching approaches, delivery modes and formats is more likely to engage students and lead to strong learning outcomes.

STRATEGIC TEACHING LEADS TO STRATEGIC LEARNING

Whole class teaching is strategic teaching which:

- builds basic skills and cognitive processes
- promotes learning strategies, problem solving and social support.

The whole class teaching model manages this complex mix of learning goals by calling into play a range of techniques that structure strategic learning. Six of those techniques are described below.

1. SEQUENCING

Arrange information in an order that is conducive to learning. Typically this involves gradually increasing the complexity of information that students work with – from simple and familiar to difficult and demanding.

Check your whole class teaching practice

- ☐ Is the lesson ordered in a logical way, appropriate to the content and the learners?

2. UNDERSTANDING

For students dealing with unfamiliar content, clarity is critical. Clarity comes with matching new information to the learners' present knowledge.

Check your whole class teaching practice

- ☐ How will I determine my students' familiarity with the information I plan to present?
- ☐ Am I planning to use terms and words that are unambiguous and within my students' experience?

3. STRUCTURING

Structuring is about organising a clear presentation so students can manage their learning. A clear presentation has three common characteristics: it states the purpose of the lesson, it reviews main ideas, and it provides transitions between sections.

Check your whole class teaching practice

- ☐ Can I clearly state the purpose of the lesson?
- ☐ Am I ready to explain at the beginning how the whole lesson is organised?
- ☐ Does my lesson plan allocate time to internal summaries by reviewing main ideas?
- ☐ Does my lesson plan provide transitions between segments in the lesson?

4. EXPLAINING

Explaining is a primary scaffolding strategy. Good explanation provides your students with context for understanding and draws in what they know already – it relates principles to facts through examples, illustrations and analogies.

Check your whole class teaching practice

- ☐ Have I considered how I will define the major concepts covered in the lesson?
- ☐ Am I ready with examples that illustrate these concepts?
- ☐ Are my examples accurate, and a mix of both the concrete and the abstract?

5. PRESENTING

This technique involves volume, pacing, articulation, and other speech mechanics.

Check your whole class teaching practice

- ☐ When I am teaching do I articulate my words clearly and project my voice loudly enough?
- ☐ Do I pace segments of my presentation at a rate that supports understanding?
- ☐ Do I support my verbal presentation with non-verbal communication and visual aids?

6. SETTING RULES

Rules help manage students' learning behaviour. Whole class discussion is most effective when clear ground rules are applied. Rules discipline discussion. They offer security to less confident students, curb dominant students and create room for reticent students.

You may need to progressively introduce and practice rules for disciplined debate. You may decide to start discussion with a simple sequence of review questions before orchestrating whole class discussion.

Whole class discussion rules typically:

- establish the teacher as chairperson
- insist on respect for all contributions
- spread contributions evenly across the class – various techniques for achieving this include numbered heads and design a question (see page 21).

Check your whole class teaching practice

- ☐ Are the rules for debate known and understood by all students?
- ☐ What are my strategies for using and maintaining the rules during whole class discussion?

SYNTAX

The syntax of a teaching model refers to the patterns, phases and guidelines that characterise the model. The whole class model of teaching follows six steps.

STEP 1: REVIEW

Review concepts and skills from the previous lesson (and homework if set).

STEP 2: PRESENT INFORMATION IN A TALK

Outline your talk.
Introduce key terms and concepts.

Proceed in small steps:
- Start with what is familiar.
- Use lively explanations & illustrations.

STEP 3: DEMONSTRATION – PPRR

Preliminaries – a guide about what to observe and expect.
Preview – outline the purpose.
Rehearsal – teacher goes through each step.
Reprise – repeat procedures.

STEP 4: STUDENT DISCUSSION

Maintain fast paced discussion focused that:
- establishes meaning
- promotes student understanding.

Assess student comprehension using high quality questioning techniques.

STEP 5: LEARNING ACTIVITIES

Design activities to focus on content.
Implement learning activities.

STEP 6: SUMMARY & REVIEW

Students ask follow-up questions.
Students share findings and conclusions.
Teacher reinforces key points, emphasises central ideas and sums up achievements.

EXPLAIN IT TO ME

Students think explaining is *the* most important teacher skill. Yet explaining is not something we tend to list as specific, high priority teacherly skill. Perhaps it's worth looking more closely. Try this professional learning exercise with your colleagues – the purpose of the exercise is simply to reveal how we go about the professional work of explaining.

EXPLAINING IT TO OURSELVES – A REFLECTIVE EXERCISE FOR TEACHERS

Ask each teacher in a professional learning group to:

1. Recall a topic which it is hard to explain to students
2. Make brief notes about how they usually explain that topic to their students.

As a group, discuss each of these questions:

- Why you have found the topic hard to explain to students?
- How you have modified your explanation over time?
- If your explanation is to succeed, what key things do your students need to understand?
- What examples, analogies, stories, visual aids, teaching strategies do you use to help your students understand this difficult topic?

As the final step in this exercise, allocate the explanations you use to one of the five types of explanation described on this page. Keep a tally in the box and discuss any patterns you see in the types of explanations used by the teachers in this professional learning group.

Tally of explanation types used	✓
1. Concepts	
2. Similarities and differences	
3. Cause and effect	
4. Purposes	
5. Processes	

TYPES OF EXPLANATION

EXPLANATION TYPE 1 – CONCEPTS

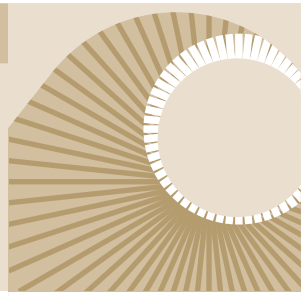
Concepts are groups or classes of things. We can divide concepts into the four categories shown below. These categories help to plan explanations. For example:

- concrete concepts can often be demonstrated with a visual aid
- to build understanding, abstract concepts may need to draw on experiences familiar to students.

Concrete familiar

Terms in everyday use and observable.

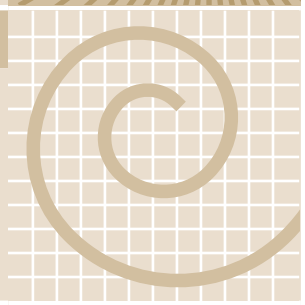
For example, ocean wave, trench, banana, crowd, dining table.



Abstract familiar

Terms in everyday use but not easily observable.

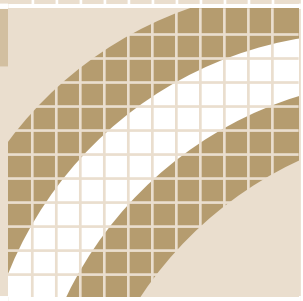
For example, design, democracy, health, flow (in dance).



Concrete technical

Terms used by specialists and which are observable.

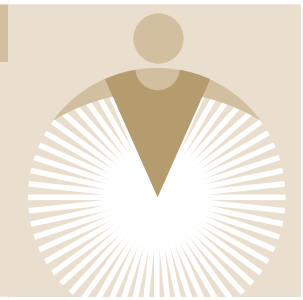
For example, thermosetting plastic, plot, body mass index.



Abstract technical

Terms used by specialists which are not observable.

For example, urbanisation, choreography, economic growth.



Concept attainment is a useful model for this type of explanation. Concept attainment is the second teaching model in this manual (see pages 31-44).

EXPLANATION TYPE 2 – SIMILARITIES AND DIFFERENCES

This type of explanation goes one step further than helping to form concepts. It also distinguishes between concepts and puts them together in groups. It is important in establishing and clarifying classifications.

For example, you might seek to explain the similarities and differences between festivals such as Christmas, Diwali, and Eid al-Fitr.

EXPLANATION TYPE 3 – CAUSE AND EFFECT

These explanations demonstrate how one thing leads to another in a causal sequence.

It is more difficult to explain events that result from a combination of factors, such as the outbreak of a war, the origins of an artistic movement, or the decline of bee populations.

EXPLANATION TYPE 4 – PURPOSES

It is often important to explain why things are done and what they are intended to achieve.

Explanation Type 4 can be particularly appropriate at the beginning of a lesson or topic. It clarifies lesson objectives for your students. For example, you might outline the reasons for assigning the letters x and y to vertical and horizontal axes on a graph, or how learning to take photographs with a tablet will aid in completing a group project.

EXPLANATION TYPE 5 – PROCESSES

Process explanations focus on how things happen or work. The emphasis is on sequence. Examples could include how to play a forehand stroke in tennis or how to use sports equipment safely.

WATCHING GOOD EXPLANATIONS AT WORK

You can actually see a good explanation at work.

First, watch what the teacher does.

Effective explaining happens when teachers…	grab attention!
	sequence explanations
	signal to students that an explanation is coming, and what type of explanation it will be
	encourage students to rehearse their understanding
	help students grasp an idea by using their own experiences and what they already know
	enhance explanations through modelling
	challenge and respond to misconceptions

Then watch how students respond.

In response to an effective explanation students…	connect new information to what they already know
	use what they know
	use their own experiences
	rehearse their current understanding
	can write and use their own explanation for a concept

These behaviours are observable. You may wish to collaborate with a peer in conducting classroom observations focused on explaining. In recording your observations it is important to note what the teacher did and then how the students responded – that's where you can watch learning take place in real time.

You could use this simple table for recording observations.

The teacher's explanation was …	Students' responded to this explanation by …	Explanation type

QUESTIONS FOR LEARNING

Curiouser and Curiouser, one of the manuals in the Curiosity and Powerful Learning series, explores the characteristics of good questions (pages 10-13). *Curiouser and Curiouser* examines in detail four types of questions that assist students at different points in their learning.

QUESTION TYPE 1
Questions we ask to stimulate curiosity when beginning a new topic

QUESTION TYPE 2
Questions we ask to sustain curiosity during learning

QUESTION TYPE 3
Questions we ask after students have learned new ideas

QUESTION TYPE 4
Questions we ask to help students transfer ideas to new situations

The whole class teaching model relies on good questioning. The examination of questioning in *Curiouser and Curiouser* describes questioning strategies and techniques. Particular aspects of questioning as they relate to whole class teaching are discussed below and on the following page.

DEEPENING YOUR QUESTIONING SKILLS

Questions are a valuable resource for your students. Reflecting on how you use questions helps to maximise the value students extract from your questions. Analysing the questions you use throws light on your questioning skills and how to improve them.

You can use the following tables to assess your questioning skills and the impact of your questioning on student learning. You may wish to involve your colleagues in a professional learning exercise in which you observe questioning in your classrooms and provide feedback about skills and impact.

MONITOR YOUR QUESTIONING SKILLS AGAINST THESE CHARACTERISTICS

Questions to ask myself	How am I doing on this?	What steps can I take to improve on this?
Can I ask fewer questions for better effect?		
As we move through a topic do my questions become increasingly challenging?		
Do my questions draw all my students into the learning process?		
Are my questions sequenced to help all my students to consolidate their learning and move to the next stage?		
Are my questions purposefully linked to the learning objectives?		
Are my questions always thought provoking?		
Do my questions create an atmosphere of trust so all students feel safe in taking the risk to answer them?		
Do I encourage my students to ask questions and help them learn the skills and language of questioning?		
Do I encourage exploratory and tentative responses, and give credit for trying even if responses miss the mark?		
Do I leave enough wait time (thinking time) before seeking answers from my students?		
Do my questions trigger genuinely collaborative discourse?		
Do my questions encourage movement from opinion to justified and reasoned judgements?		

MONITORING THE IMPACT OF QUESTIONING ON LEARNING BEHAVIOURS

Students engage in question and answer episodes that …	**Record an instance of this learning behaviour and the question and answer episode leading to it**
Produce extended answers using appropriate introductory words, and connecting or linking words	
Build on each other's answers, agreeing or disagreeing with their peers using valid subject-based reasoning and logic	
Ask more cognitive questions of each other and of me	
Move from concrete, factual, descriptive talk to theoretical, explanatory, analytical talk	
Use technical terms routinely in their responses	
Speculate and extrapolate from evidence	
Draw on examples from beyond the immediate context	
Show increasing evidence of big picture thinking by using generalisations and explanations	
Seek to puzzle through when they face cognitive conflict	
Share their thinking out loud	
Apply new learning to different situations and contexts	

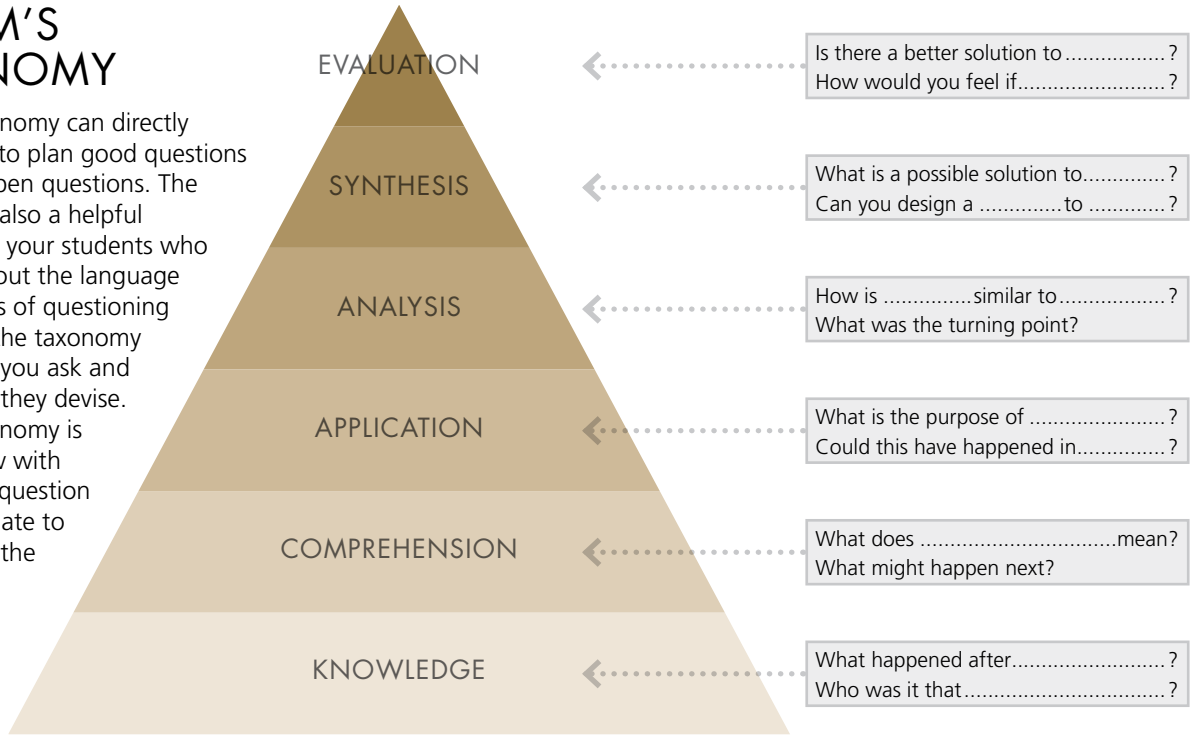
PLANNING YOUR QUESTIONS

When planning a lesson or topic it is useful to check that your plan meets three criteria for good questioning.

Criterion 1	At the beginning of the lesson/topic I plan to share the key questions that students will try to answer. I plan to refer to the key questions at various stages and to return to them in the plenary session.
Criterion 2	My plan includes different types of questioning that are suited to the stage of learning and which will draw in all students.
Criterion 2	My plan includes more questions that call on higher order thinking skills than questions that demonstrate knowledge alone. *(See Bloom's Taxonomy below.)*

BLOOM'S TAXONOMY

Bloom's Taxonomy can directly support you to plan good questions and frame open questions. The Taxonomy is also a helpful reference for your students who can learn about the language and purposes of questioning by applying the taxonomy to questions you ask and to questions they devise. Bloom's Taxonomy is shown below with examples of question types that relate to each level in the taxonomy.



THE VIRTUES OF OPEN QUESTIONS

Closed questions tend to elicit one word answers (yes/no) or assume that there is one 'right' answer which your students are expected to provide. Open questions provoke many lines of inquiry and possible answers. Open questions prompt curiosity and engagement.

Pose your questions in ways that allow for many answers, all of which can be considered. This helps set the tone for inquiry. Open questions indicate you are open to answers you are not expecting, rather than expecting only those answers you already have in your mind.

Which of the questions in these pairs signal that more than one answer is possible?

Why do you think Beijing might have more pollution than London?	Why does Beijing have more pollution than London?
What is the second state of photosynthesis called?	What can you tell me about photosynthesis?
What is the capital of Canada?	What would it be like to live in Ottawa?

QUESTIONING TECHNIQUES

You can employ the six techniques described here in any classroom and at many different points in a lesson or topic.

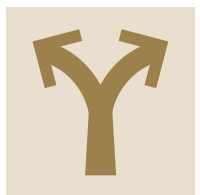
Good questions provide a platform for collaborative work that produces a rich set of answers. Collaborative work can draw all students into the conversation about possible answers. There are many ways to organise collaborative work in which the task is to determine possible answers. Several of the techniques described below incorporate collaboration and there are many others. For example, you can ask a question of an individual student and indicate they can nominate anyone else in the class to help answer it.

THINK. PAIR. SHARE.

This technique gives every student an opportunity to devise an answer with a friend.

After your pose a question ask your students to think about an answer themselves for 30 seconds or so. Then ask them to pair up and share their ideas/opinions for about one minute.

You can then ask each student for their answer, or ask them to provide their partner's answer.



WHAT WOULD HAPPEN IF...?

Asking your students to predict helps them to sharpen an important skill. Prediction questions help students apply what they know to new circumstances. There are many ways to frame prediction questions, including:

- *What would happen if* we pour vinegar over the bicarbonate of soda?
- *Can you predict* how your game of chess will end?
- *What information would you need to predict* when this egg will hatch?
- *What do you think will happen next* in this story?

You can use prediction questions with the technique described above – Think. Pair. Share.

NUMBERED HEADS

This technique is used when students are working in pairs or small groups. Let's assume the class is working in groups of three. Ask each group to allocate the numbers 1, 2 and 3 to the students in their group.

Pose your question to the class and allow each group a few minutes to work together on devising one or more possible answers. Now ask all the students who were allocated number 1 (or 2, or 3) to put their hands up. Ask two or three of those students for their responses.

Numbered heads can help to keep all students on task because they know they might be asked to respond after group discussion is over.

STACKING THE ANSWERS

Pose your question to the class. Take two or three answers from students who appear to be struggling to meet the learning objectives – but make no comment on whether the response is close or far from the mark.

Now take two or three answers from students who are closest to meeting the learning objectives.

As you keep taking answers from across the class the responses become increasingly sophisticated, with all students having an opportunity to contribute.

HERE IS THE ANSWER. WHAT IS THE QUESTION?

This approach is often used in numeracy lessons as a starter when you might say: 'The answer is 50. What is the question?' In response you might get a different answer from every member of the class.

You can apply this technique across the curriculum as a starter for a lesson or a topic:

– The answer is *dans le matin*. What is the question?
– The answer is carbon dating. What is the question?
– The answer is editing. What is the question?

DESIGN A QUESTION

Ask the class to organise into pairs. Show the class a diagram, or a photograph, or an object. Ask each pair to formulate two or three questions about the item that they can ask another pair to answer.

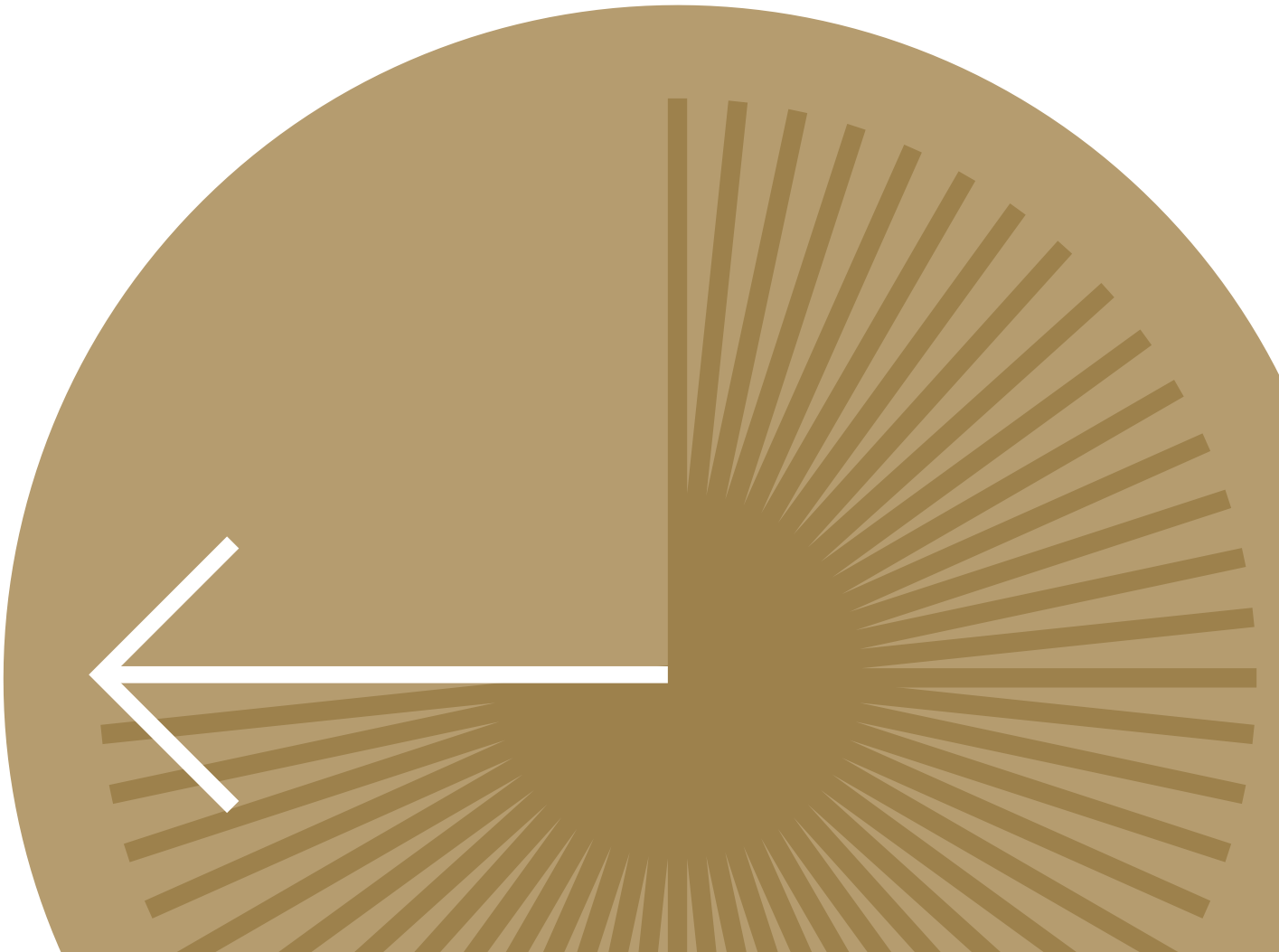
Ask each pair to join another pair so the class is now organised in groups of four. Each original pair then has three or four minutes to ask their questions of the other two students in the group.

You can make this task more demanding by asking each pair to design questions about the item that relate to one or two levels of Bloom's Taxonomy. You can provide model questions like those on the opposite page. This helps students to gain a firmer understanding of the language of questioning, and the purposes of different kinds of questions.

WAIT TIME

In *Curiouser and Curiouser*, one of the manuals in the Curiosity and Powerful Learning series, the importance of wait time is emphasised (page 10). Here is part of that discussion on wait time:

> Consistently extending wait time from 1 second to 3 seconds has several positive impacts on student responses:
>
> - responses are longer
> - the number of spontaneous and relevant responses increases
> - failure to respond decreases
> - student confidence in responding improves
> - the number of speculative responses increases
> - the likelihood of inferences based on evidence increases
> - there is an increase in the number of different approaches to a question or problem
> - students are more likely to stay focussed on a question or problem.



QUESTION STRATEGY – AN EXERCISE FOR TEACHERS

As noted earlier, the Whole Class Teaching Model relies on teachers talking with students, listening to them and guiding their learning activities. Implementing whole class teaching requires teacher judgement about the capability of the class to engage in a learning conversation and to manage their own learning.

Questioning strategies are a fundamental part of the teacher toolkit for enabling the development of these capabilities. The specific strategies a teacher uses will vary with each class and vary over time as each class develops its capabilities.

This Diamond Nine exercise can help you to identify strategies that may be useful right now. (On page 21 of *Models of Practice 1&2* Diamond Nine is also suggested as a teaching strategy in the cooperative group work teaching model.)

STEP 1

Photocopy the nine pieces of information below and cut them out.

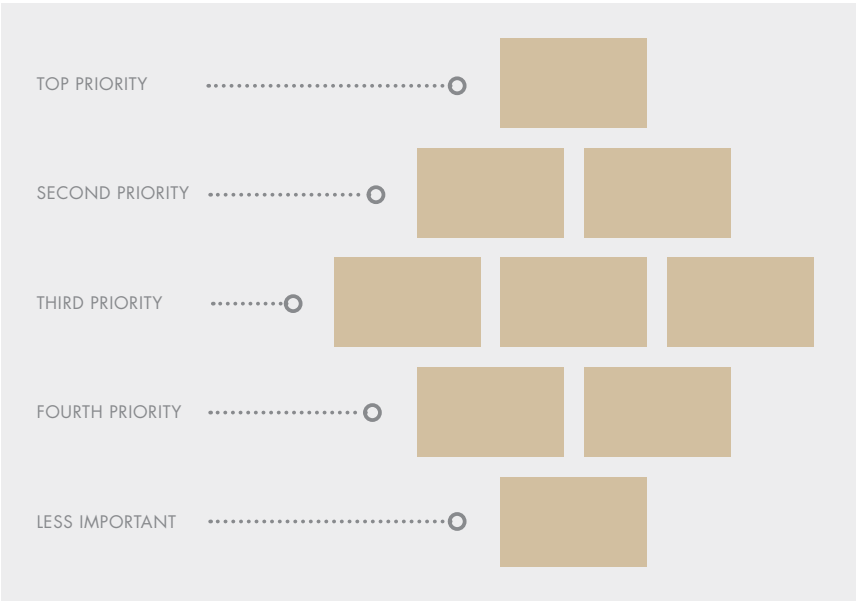
STEP 2

With two or three of your colleagues, organise the nine strategies into a diamond with the highest value strategy at the top and lowest value strategy at the bottom.

Your completed diamond will look like the diagram at right.

STEP 3

Finally, think about a particular class you are teaching. Explain to your colleagues why, for that class, you might alter the priorities you have allocated.



Ask questions like this:

- Can you predict …?
- What might happen next?

Ask students to design questions based on the resources you provide.

Use student questions as the basis for a class or group quiz.

Use a variety of open questions and closed questions.

Create an atmosphere where students feel comfortable to respond to questions when they are uncertain of the best or right answer.

Choose less able students to respond to questions first.

Take further answers that build towards a sophisticated response.

With the whole class, work up a common response to the question.

Ask questions that start like this:

- What would you feel about …?

Tell the class that:

- you are going to ask a question
- you will give them some time to think about it
- you will then select two or three students to respond.

Ask questions that begin like this:

- How would you summarise …?

Force students to think about an answer to your question by increasing wait time before taking a response.

PLENARIES IN WHOLE CLASS TEACHING

PLENARIES WITH PURPOSE

Aim to achieve three objectives in a plenary:
- focus attention of the whole class on the learning objectives for a lesson and topic
- engage students in a discussion about what they have learnt
- engage students in a discussion about how they can apply that learning.

Effective student-centred teaching is characterised by planning for and managing plenaries.

WHY CONDUCT PLENARIES?

There are three important reasons for incorporating plenaries into your lesson designs.

First, when students are directly asked to reflect on their learning they retain that learn for longer.

Second, there is a motivational perspective. Students gain a sense of achievement when they can identify lesson objectives they have understood and achieved.

The third reason for conducting plenaries is that they allow you to analyse how much progress your students have made. That information becomes central to your planning for subsequent lessons. A plenary yields assessment for learning.

PRIORITISING PLENARIES

Despite these compelling reasons for conducting plenaries sufficient time is often not reserved for them. You need to make it a firm priority that a plenary will occur as part of a learning episode.

You have considerable flexibility about how that priority is acted on. You may decide to leave a plenary until the end of the lesson. Mini-plenaries or feedback sessions during a lesson are also valuable. Sessions like this enable you to maintain students' focus on the task before them, and to offer a forum for students to share ideas on how to think about and complete the task.

TWO GREAT PLENARY QUESTIONS

Plenary sessions thrive when good questions promote lively interaction that engages all students. There is no fixed formula for a plenary session. You will exercise your professional judgement about when to insert a plenary session in a lesson and you will select a format most suitable for that topic, that class, that stage of learning.

There is no formula, but two questions can play a valuable role in most plenaries:
- How did you do that?
- Where else could you use what you have learnt today?

The first question asks students to reflect on how they learned. The second question asks students to reflect on how they can apply their learning. Both questions can incorporate reflections on what students will do next to further their learning or improve their skills.

There are, of course, many ways that you can vary these questions to suit the circumstances.

FOUR STEP PROCESS FOR IMPROVING PLENARY PRACTICE

Your plenary practice can substantially improve student learning. The four step process described on the opposite page can help you to progressively improve your plenary practice.

You may wish to join with colleagues in peer observation partnerships that have the objective of improving plenary practice.

STEP 1
LEARNING BEHAVIOURS AND OUTCOMES

In every class we look for the presence of a familiar set of metacognitive learning behaviours and outcomes. These kinds of behaviours and outcomes are set out below. Plenaries can nurture each of the listed learning behaviours and outcomes.

From the list below, select two learning outcomes or behaviours you would like to prioritise over the next few weeks as outcomes for plenary sessions in your classes.

Highly valued learning outcomes and behaviours – my students will…	**My priorities** ✓
1. Seek out and ask for clarity	
2. Synthesise their main learning and distinguish between key learning points and supporting detail	
3. Confidently describe, analyse and reflect on their learning	
4. Value their learning	
5. Celebrate their successes and have a sense of achievement	
6. Understand how they can apply their learning	
7. Develop strategies for remembering what they have learned	
8. Develop curiosity about further learning	
9. Make decisions about their next steps in learning	

STEP 2
PLENARY PRACTICE

Of course, these student learning outcomes and behaviours are intimately related to how teachers carry out their work. The table below lists what we know about how plenaries shape and realise highly valued learning outcomes and behaviours. This is a formidable list of teaching practice points to keep in mind at any one time.

Great teachers keep looking for ways to capture this kind of teaching practice in their day to day work. The more you work to incorporate them in your practice the more likely it is that they will become practice habits.

From the list below, select one or two plenary teaching practices you would like to improve.

There is evidence that plenaries are effective when teachers …	**My selections** ✓
A. Routinely plan and use plenaries linked to learning objectives	
B. Run plenaries at strategic moments within the lesson	
C. Summarise and extend the learning	
D. Build variety into plenaries to cater for different learner types	
E. Reserve dedicated time for plenaries	
F. Keep the focus of the lesson on 'learning' rather than 'doing' tasks	
G. Question, engage, challenge and draw in all students	
H. Value the responses of all	
I. Highlight progress made and link to future learning	
J. Explicitly draw out the lesson's main messages	
K. Address misconceptions	
L. Assess the learning which has taken place and plan for further learning	
M. Create expectations and a habit of student reflection	
N. Focus thinking on applications of the learning	

STEP 3
PLENARY DESIGN

Select two or three plenary designs from the following pages that you think will assist you to:

- shape valuable learning outcomes and behaviours
- extend your repertoire of plenary formats
- improve your conduct of plenaries.

STEP 4
MONITORING AND REFLECTION

Monitor how your plenary practice changes over the next few weeks. Use these notes to reflect on how you can continue to improve your plenary practice, perhaps using this four step process again.

IMPROVING MY PLENARY PRACTICE

Planning dates	FROM / / TO / /
Step 1 – Learning behaviours & outcomes I will focus on	
Step 2 – Plenary practices I will focus on	
Step 3 – Plenary designs that work with focus points under Steps 1 & 2	
Step 4 – Notes for monitoring and self-reflection. You may find it helpful to consider these questions when writing your notes: – What have I improved on? – Where am I stuck? – What will I do next to improve my plenary practice?	

IDEAS FOR WHOLE CLASS PLENARIES

There are numerous ways to structure plenaries. Here is a list of almost 50 ideas for plenaries. They are allocated to categories so they are easier to locate, but the categories are not hard and fast. Most of these suggestions can fill various purposes – you can adapt them as lesson starters and as mini-plenaries within the lesson, as well as use them at the end of a lesson.

LINKING PLENARIES AND LESSON OBJECTIVES

You can link these plenary ideas to the objectives for a lesson or series of lessons you are planning. Used in this way, the plenaries can support assessment for learning.

➔ **Traffic lights**
Teacher asks students to hold up one of three cards for each lesson objective:
- GREEN = I understand this or can do it well.
- AMBER = I am not 100% sure.
- RED = I need further help.

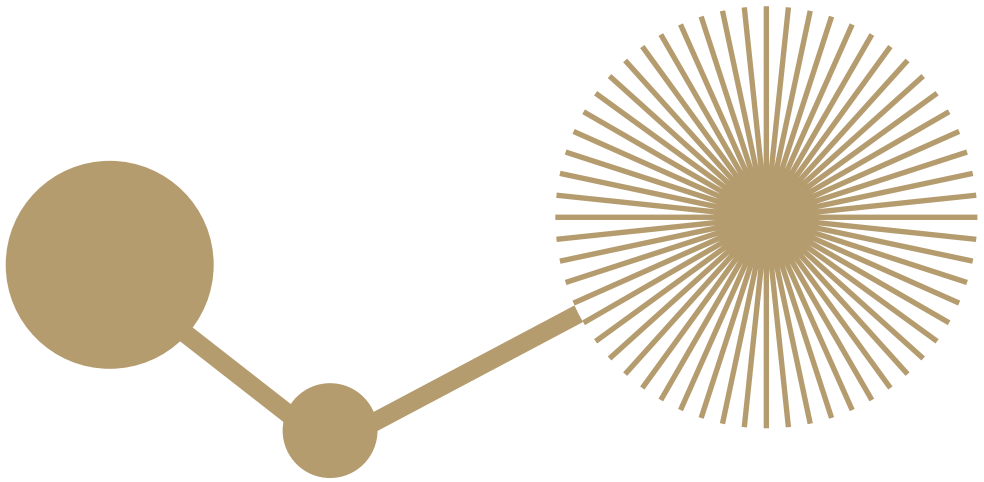
➔ **Tweet it**
Summarise the key things you have learned today by composing a tweet of up to 160 characters. (As an alternative, list the key things you have learned today in five bullet points.)

➔ **Good thinking**
Ask each student to write down the name of another student who said something significant about the learning in the lesson. Ask them to feedback to that student and/or the whole class, with reasons.

➔ **One, two**
Students take one minute to compose two statements in their heads that explain what we have learnt and how we have learnt it. Ask students to share their statements with another student and/or with the whole class.

➔ **Prediction**
Ask your students these questions and leave plenty of wait time:
- What will happen next?
- Why do you think this?

➔ **Use it**
Where can you apply the skill or knowledge you have learnt today? Think of two or three examples. Share your examples with another student and/or with the whole class.



➔ **On the line**
Set up a piece of string across the classroom. The string represents a continuum. Ask students to write their name on a piece of paper and peg it on the string to show their view on an issue/topic covered in the lesson.

➔ **What next?**
Ask students to consider how well they have achieved each of the lesson's objectives. Now ask them to work in pairs to set targets for their next stage of learning about the topic.
(You may want to provide a list of suggestions for your students to choose from.)

➔ **Ask your classmates**
In pairs, write down three questions you would like to ask as a result of what you have learned in the lesson. Teacher selects a group to ask another group to answer their questions.

➔ **Back to front**
Ask your students to form two lines with equal numbers. The 'front' student in one line asks a lesson specific question of the 'back' student in the other line. Run along the line until the question is satisfactorily answered. Once answered the questioner and responder both leave their lines.

➔ **Pearl of wisdom**
At the end of the lesson ask each student to go to someone they have not spoken to during the lesson. Each student then passes on a pearl of wisdom from the lesson. The pairs then split and each student forms another pair, and this time passes on the pearl of wisdom they have just heard.

➔ **Advice**
Teacher shares an extract from the work of a previous student. Ask your students to identify three strengths and three pieces of advice for re-drafting.
(You need to plan ahead for this one. Select a piece of work from a student and ask their permission to share it with next year's class.)

GET IT IN WRITING

➔ **Back to the question**
Set the topic of the lesson as a question. At the end of the lesson ask students to answer the question in a sentence. Impose a word limit for extra challenge.

➔ **Farewell**
Write the epitaph for a character you have studied, or a scientist whose work you have drawn on, or politician or leader who played a role in the lesson's topic.

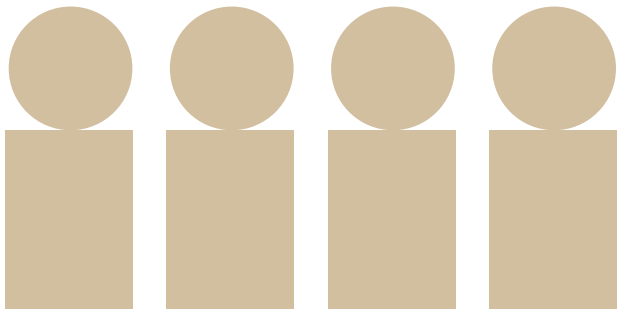
➔ **Carry on …**
Give your students an opening to a sentence related to the lesson. Ask them to finish the sentence.

➔ **Just a minute**
In 60 seconds write down all the words you can think of to describe an aspect of the lesson.

➔ **Top tips**
Ask each student to write the top tips or golden rules they have drawn from the lesson.

➔ **Nice jacket**
Imagine you have just read a book about the topic of the lesson. Write a short blurb for the book jacket that will encourage other people to read the book.

➔ **Meaning?**
Write dictionary definitions for new terms learnt in today's lesson.



ASK ME

➔ **Back to the beginning**
Provide an answer to some aspect of the lesson – a maths problem, a referee's decision, a chemical reaction, a line of code, a character's dilemma. Then pose this task to your students:

- That is the answer. What is the question?

➔ **Million dollar questions**
Ask your students to write down three or four questions about the topic you have studied. Questions can be devised individually or in groups. The questions must be brief – 10-15 words. Now ask your students to put their questions to another student, or to other groups.

➔ **Role change**
Ask each student to consider themselves the teacher of the class. Their task is to respond to this challenge:

- What questions about this lesson would you ask the class and why?

➔ **Hot role**
This is a hot-seating activity. A student is given a role – a reporter, a character in a novel, a scientist, a mayor. The rest of the class ask can ask the student two or three questions before someone else takes on a role. All questions are answered in role.

GROUP ACTIVITIES

➔ **Feedback by turns**
One or two small groups provide feedback to the whole class on the learning that has occurred during a lesson or series of lessons.

If groups in the class have relatively consistent membership you can establish a roster which indicates which group is next in line to provide feedback. Alternatively you can allocate the feedback task by a roll of dice.

➔ **Quick definitions**
In preparation, teacher draws up a list of terms or words and matching definitions for each. In class, put up two identical lists of the terms or words. Form the class into two teams that line up behind a line on floor. Read out a definition. The first student from either line to run up and hit the word that aligns with the definition wins a point for their group.

➔ **Envoying**
During or at completion of a difficult group work task, one representative from each group visits other groups to share findings. The representative reports back to 'base' about what they have learned from other groups.

➔ **Let me explain**
Divide the class into groups of three and ask students to allocate the numbers 1, 2 and 3 to each other. Put up three statements relating to the lesson or topic and ask student number 1 to explain the first statement to the rest of the group. Follow the same pattern for the remaining two statements.

➔ **Acting out**
Ask small groups of students to create for the whole class a tableau, or freeze frame summary, of a key point covered during the lesson or topic.

➔ **Question, response, record, share**
In groups of three, students take one of these roles: Questioner, Responder, Recorder. You may need a group of four to ensure everyone is in a group. If so, you can allocate a fourth role of Sharer.

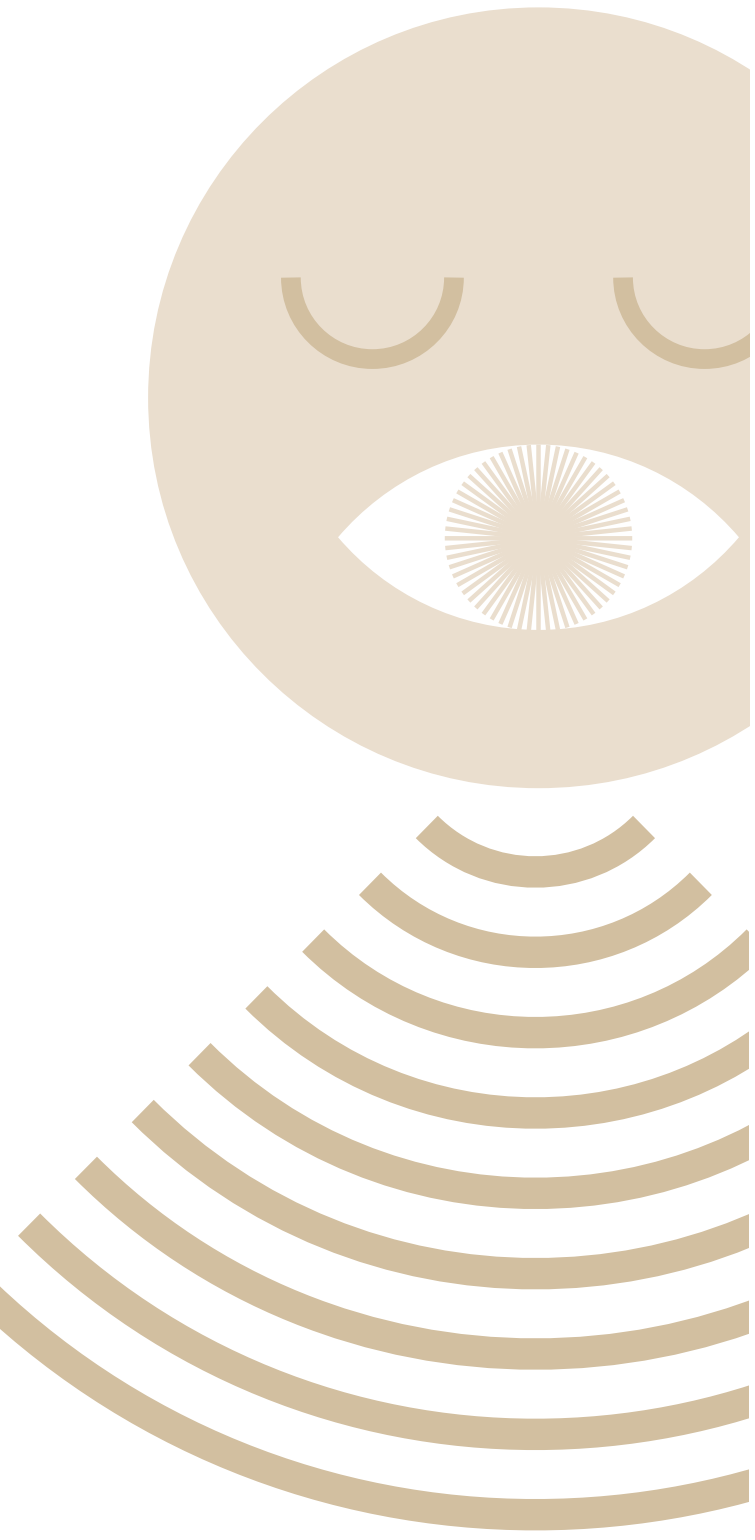
Ask students, in their roles, to work for a minute or two on one of the lesson's learning objectives. The Recorder (or Sharer) can then report to the whole class, or to another group, on the outcome.

➔ **Jigsaw feedback**
In small groups students work on different parts of a task, then each group shares their task outcome with the whole class.

➔ **As we see it**
Ask students to work in pairs to answer the key question for a lesson or topic. The answer each pair devises must fit onto a large post-it note. After three minutes each pair sticks their answer on the wall and all students review the answers.

Returning to their pairs, students discuss how their answer compares with other answers and whether they would revise their answer.

➔ **Step by step**
Put up a list of 3-6 factors/influences/events about the topic covered in a lesson. In pairs ask students to sequence the items on the list. Select two or three pairs to report their sequence to the whole class and to justify the order they have chosen.



VISUALLY SPEAKING

➔ **Finger rating**
Ask students to assess the effectiveness of an image or technique by holding up the appropriate number of fingers – one finger for ineffective, five fingers for very effective.

➔ **Bingo**
In preparation, write on a sheet of paper a selection of terms, techniques, dates that the lesson will cover. Each item should be placed on the paper among other items that are not relevant – something like a bingo card. Photocopy enough sheets for each student.

At the appropriate point in a lesson hand out the sheet. As you read out or show each item students spot it and mark it on their own sheet.

➔ **Learning labels**
In preparation, select one or more diagrams or illustrations that relate to the lesson objectives. Distribute them to small groups and ask each group to insert labels. After two minutes the diagrams/ illustrations pass to another group which assesses the existing labels and adds other labels.

➔ **True or false**
In preparation, make a list of statements about the lesson's topic that are both true and false. Read or show each statement and ask students to signal whether the statement is true or false – thumbs up/thumbs down, or green/red cards, or laugh/hiss.

➔ **Drawn out**
Ask students – individually, in pairs, or in small groups – to create a graphic summary of the lesson. The summary could be in the form of steps, a flowchart, a mind map.

➔ **You don't say**
Take an important term or word from the lesson, draw it and show it to a classmate without speaking or writing the word itself. The challenge for your classmate is to identify the term or word from your drawing of it.

➔ **Codebreaker**
In preparation, create anagrams or codes that contain key points from a lesson. Distribute copies of the anagrams or codes and ask students to unscramble the meanings. This can be done in groups, pairs or for homework.

➔ **Looks like**
In preparation, select four or five images or cartoons. Show them at the same time to whole class and ask:

- Which images/cartoons do you associate with the learning in this lesson?
- What makes you associate the image/cartoon with the lesson?

OUT LOUD

➔ **Quick quiz**
In preparation, write about ten short questions related to the lesson objectives and topic. Ask the questions quickfire in class, setting aside 'wait time' rules. You may wish to put the questions to small groups of students so that answers are gathered from across the whole class.

➔ **Hang on to that thought**
Initiate a whole class discussion about to how they will remember key ideas covered in a lesson or series of lessons.

(It may be helpful to introduce some ideas from the Mnemonics Model of Practice which appears in *Models of Practice 5&6*, one of the manuals in the Curiosity and Powerful Learning series.)

➔ **Your call**
Ask the class to form into pairs. Each student asks their partner to identify three things they learned today.

➔ **My call**
Ask each student to list three things they learned today. You may want to collect these reflections and/or ask some students to share their learnings with the whole class. You can ask students to focus on the learning objectives or topic. You can also encourage them to list things that are about metacognitive learning – learning how to learn.

➔ **That was tough**
High expectations are important and this often means lessons involve very demanding ideas or the application of highly developed skills. You can initiate discussion in a whole class plenary that encourages reflection on:

- the difficulties involved in the lesson's learning
- strategies students could adopt in future to manage or resolve similar difficulties.

➔ **Well read**
Invite students to share their written work with the class by reading it out. Encourage a respectful response from the whole class by focusing both on the strengths of the writing and what can be improved.

➔ **Your pick**
In preparation, write five statements related to a lesson objective. Put up the five statements during class and ask your students to choose the three statements which best reflect the lesson objective.

PEER COACHING GUIDE: LEARNING IN A WHOLE CLASS CONTEXT

This Peer Coaching Guide takes a general perspective on whole class teaching. It does not deal with specific whole class teaching strategies. You may wish to focus peer coaching on a specific whole class teaching strategy, and to complete Parts 1 and 2 of that strategy in mind.

As we noted on page 1, there are four steps in the peer coaching process.

Step 1	Teachers form a partnership to study student responses, and to plan how to help students learn more effectively.
Step 2	The teaching peer prepares the peer observer by completing the entries in the Peer Coaching Guide: Part 1 – Preparation for Observation.
Step 3	Identify the problem, issue, area of knowledge, or set of skills you will formally present to your students in the opening talk or demonstration.
Step 4	The peer observer communicates the result to the teaching peer. Step 3 is completed in about five minutes.

STAGES IN WHOLE CLASS TEACHING

The Peer Coaching Guide works through the stages of the whole class teaching model, which are shown on page 14 like this.

Planning	Before implementing whole class teaching the teacher: – specifies learning objectives – relates the learning and teaching program to the objectives
Talk & demonstration	Through lecture or demonstration, formally present your students with: – a problem – an issue – an area of knowledge – a set of skills.
Inquiry & Questioning	Students develop understanding through: – systematic questioning – disciplined inquiry.
Apply understanding	Students apply their understanding through a series of set tasks.

PEER COACHING GUIDE:
PART 1 – PREPARATION FOR OBSERVATION

QUESTIONS FOR THE TEACHING PEER TO COMPLETE	
Do you want to suggest a focus for the analysis? If so, what is it?	

QUESTIONS FOR THE TEACHING PEER TO COMPLETE	
What are your specific learning objectives for the lesson? How are the objectives linked to the learning and teaching program?	
Identify the problem, issue, area of knowledge, or set of skills you will formally present to your students in the opening talk or demonstration.	
Describe the systematic questioning or disciplined inquiry strategies you will use to develop student understanding.	
Describe or list the set of tasks you propose to use so students can apply the understanding they develop during the lesson.	

PEER COACHING GUIDE:
PART 2 – OBSERVATION CHECKLIST

As the peer observer:

- familiarise yourself with the plan set out in Part 1,
- situate yourself in the room so that you can observe about six students closely.

During the teaching episode:

- concentrate on the behaviour of students
- comment on their performance.

QUESTIONS FOR THE OBSERVING PEER TO COMPLETE	
Are students clear about the lesson's focus?	
If yes, what evidence do you see that shows they are clear about the lesson's focus?	
If not, what aspects of the lesson's focus appear to be unclear to them?	
What student behaviours indicate positive responses to questioning or inquiry strategies?	
Are some students responding positively and some disengaged?	
Which questioning or inquiry strategies appear to most effectively drive student learning?	
Are students clear about the set tasks that assist them to apply their learning?	
What evidence do you see?	
Which tasks appear to have the greatest impact on learning?	
How can you tell?	
What aspects of whole class plenaries support learning most effectively?	
Does the effectiveness of whole class plenaries appear to vary for different students?	
What do the variations look like?	

PEER COACHING GUIDE:
DISCUSSION

After the teaching episode the peer observer relays their observations to the teaching peer. Peers then discuss the observations recorded about the whole class teaching episode. Use these questions to guide discussion:

- Did students appear to understand what they would be learning during the lesson?
- Did students appear to understand how the opening talk/demonstration linked to the questioning/inquiry strategies used?
- What new learning was demonstrated through the set tasks in which students applied their understanding?

CONCEPT ATTAINMENT
THE MODEL OF PRACTICE

Concept attainment is a model of teaching that expands students' ability to acquire, control and remember information.

4

DESCRIPTION

Concept attainment requires students to ascertain already formed and defined concepts. They achieve this by comparing and contrasting examples, or Exemplars. Exemplars contain the attributes of the concept. When students specify the attributes of a particular concept category they can distinguish Positive Exemplars from Negative Exemplars.

Concept attainment enables students and teachers to:
- reflect on and analyse thought processes
- evaluate how to improve thinking.

Research shows that students learn how to attain concepts through practice. The more they practice manipulating concepts, the more effectively they attain, and can apply, conceptual knowledge.

Concept attainment has five important attributes

Concept attainment allows our students to…	practice reasoning, and to use logical thought processes
	engage deeply with ideas
	play with ideas
	recognise the possibility of alternative and opposing perspectives and explanations
	accept the importance of tolerating ambiguity

Specific student behaviours signal that well planned concept attainment is having its intended influence on learning how to learn.

We know concept attainment is working for our students when they…	are willing to express a view, even though they feel uncertain
	understand important concepts by analysing their attributes
	create other attributes which describe the concept
	use categorising and prioritising to further their understanding
	demonstrate their skills by listening, sharing information and expressing reasons for their views
	discuss alternatives before deciding, including challenging each other
	are prepared to change their minds
	learn from the different ways other students approach the problem

SYNTAX

The syntax of a teaching model refers to the patterns, phases and guidelines that characterise the model. The concept attainment teaching model has three phases. (The teacher also completes a preparatory phase which is described on the following page.)

PHASE 1: **Present data and identify the concept**

1.1 Students undertake parts of this phase individually.
You will use your judgement about how much group work (if any) to build in.

1.2 The teacher presents labelled examples

1.3 Students compare attributes in positive and negative examples

1.4 Students generate and test hypotheses

1.5 Students state a definition according to the essential attributes

In Phase 1, data is presented to students in the form of 'example' and 'non-example'. This information is presented in pairs. To begin with only a few examples are given to enable students to focus on the differences and similarities between the examples.

The data may be in the form of events, people, descriptions or illustrations. The form of the data depends on the concepts teachers wish to elicit.

On receiving data students are informed that:
- there is one common idea contained in all the positive examples
- this idea is not present in the negative examples.

Students then develop a hypothesis about the nature of this idea. They ascertain the hypothesis from comparing the positive and negative examples.

Each student then names their idea and defines its essential attributes.

PHASE 2: **Test attainment of the concept**

2.1 Students identify additional unlabelled examples as either 'yes' or 'no'.

2.2 The teacher confirms hypotheses, names concept, and restates definitions

2.3 Students generate examples according to essential attributes

In Phase 2, students test their understanding (attainment) of the idea (concept).

They do this in three steps:
- considering additional examples and re-examining their idea
- identifying additional unlabelled examples of the concept
- generating their own examples.

At this point the teacher asks students to share their hypotheses and confirms the correct concept along with its key attributes.

PHASE 3: **Analyse thinking strategies**

3.1 Students describe thoughts

3.2 Students discuss the role of hypotheses and attributes

3.3 Students discuss the type and number of hypotheses

In Phase 3, students consider how they arrived at their conclusion. They revisit the thinking processes they used when they analysed the data.

In reflecting on their thought process with other students they are more able to evaluate their ability to reason and to think logically.

With the teacher's assistance, students are encouraged to consider the effectiveness of their own thinking strategies.

ACTIVITY PHASES

DEFINITION

Concept attainment is:

– the search for, and listing of, attributes (or characteristics) that students can use to distinguish Positive Exemplars from Negative Exemplars of various categories.

The purpose of the concept attainment process is to clarify the attributes of a category or concept.

PRACTICALITIES

The model of practice is used in a whole class context. It can be used with students of all ability levels.

The process usually takes about 10-15 minutes – the time required depends on the complexity and amount of data used.

It is an ideal starter activity.

PREPARATION PHASE

To teach a concept, it is important to be very clear about its defining attributes.

Select a concept which students often find hard to grasp, then choose:

– up to 20 words or statements which illustrate the concept – these are Positive Exemplars
– the same number of words or statements which clearly do not represent the concept – these 'opposite' words are Negative Exemplars.

An example from teaching English might be the concept of alliteration. The teacher begins by selecting Positive Exemplars of alliteration, and a matching number of Negative Exemplars which are not alliterative.

PHASE 1: **Present data and identify the concept**

Let's stay with teaching the concept of alliteration. Begin by writing headings on the whiteboard – the headings may read 'Positive Exemplars' and 'Negative Exemplars', or simply 'Yes' and 'No'.

Phase 1 could begin with these Exemplars:

– **Positive Exemplars**
The rifles' rapid rattle
Bloody, blameful, blade

– **Negative Exemplars**
The swift and deadly rifle shot
The gory slicing blade

After presenting two or three pairs ask students to write down why, in their opinion, the Positive Exemplars belong with each other. What attributes do they have in common? Their writing represents an attempt at a concept or hypothesis.

It is good to encourage a culture in the class where the students are willing to have a guess at this stage. They are likely to feel comfortable about having a guess if they know there will be later opportunities to change or modify their guesswork.

Now present Exemplars individually. Ask students to vote with a show of hands in which column they would place each Exemplar.

You can continue to present Exemplars as pairs, or by mixing them up – for example, two Positive Exemplars followed by three Negative Exemplars.

If students realise their hypotheses are inaccurate encourage them to try out others. As time progresses agreement will emerge as the class begins to firm up a notion of the concept.

Once the class arrives at the point where all or most agree, ask your students to discuss in pairs the nature of their hypothesis.

You may wish to present more pairs of Exemplars at this stage.

Now ask your students to:

– name their concepts
– state the rules or definitions of their concepts according to their essential attributes.

PHASE 2: **Test attainment of the concept**

Phase Two commences with the teacher confirming which hypotheses are correct and then naming the concept. This may be the first time the technical term, such as 'alliteration', is used.

The teacher then states the concept definition according to its essential attributes.

There are many ways to test attainment of a concept. For example, the concept of alliteration could be tested using one of these approaches.

Ask students to produce new examples of alliteration which fit the 'yes' category.

Present students with a number of poems and ask them to find Positive Exemplars.

Provide students with some Negative Exemplars and ask them to make changes so they become Positive Exemplars.

Ask students to work in twos or threes to prioritise the attributes of alliteration – which are the most important attributes that define alliteration?

If there are categories within the attributes, you can ask students to classify these attributes.

PHASE 3: **Analyse thinking strategies**

Research shows that students learn concepts more effectively if they understand more fully the ways in which their thinking has been working.

In Phase 3 of the model students begin to analyse the strategies by which they attain concepts.

Engage students in describing the way their thinking worked. Gradually, through discussion and reflection they learn to compare the effectiveness of different thinking strategies:

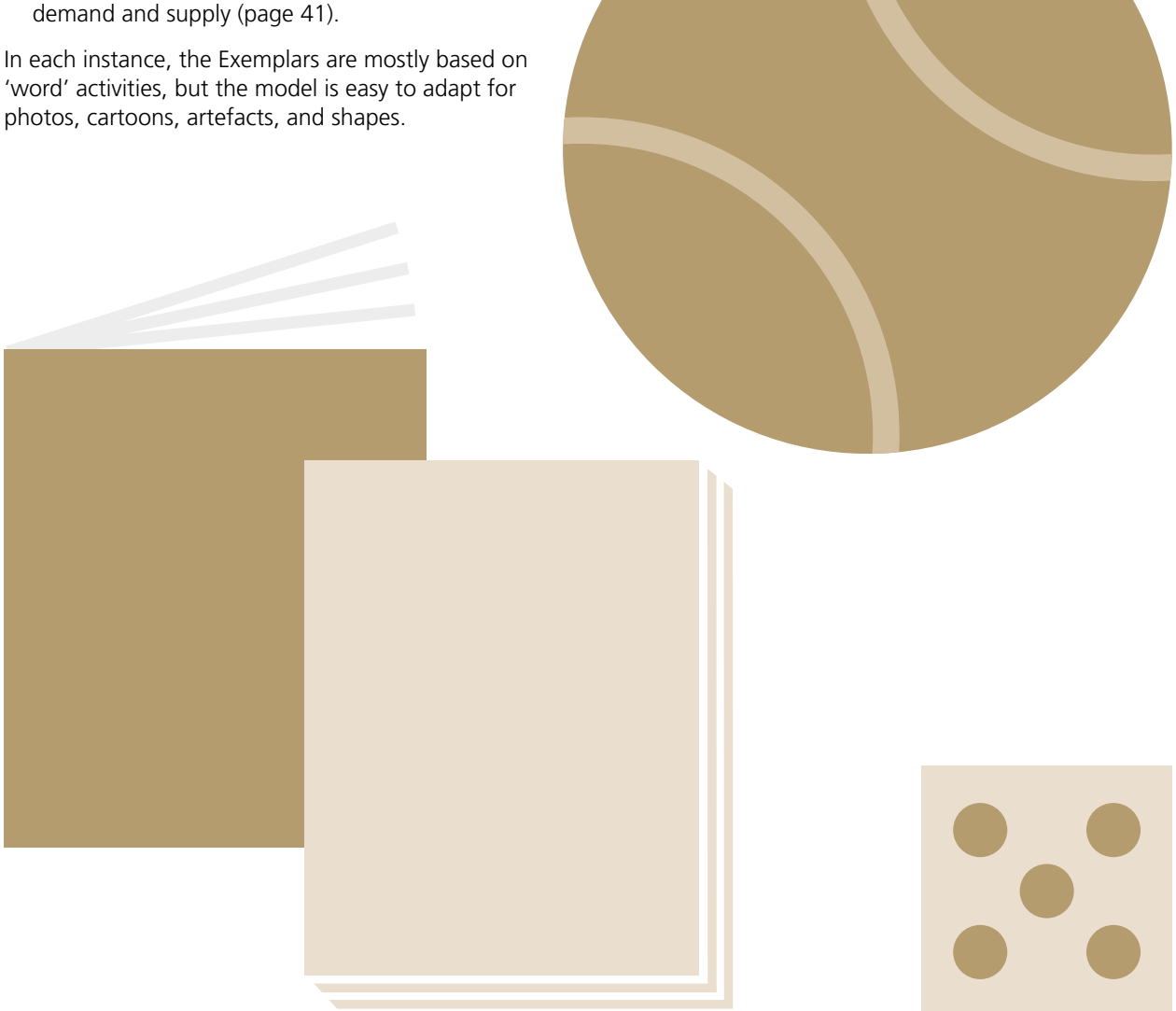
– do they focus on attributes or concepts?
– do they focus on attributes or concepts one at a time, or do they consider several at once?
– when their hypotheses are not confirmed do they change strategies?

CONCEPT ATTAINMENT IN ACTION

All subjects and topics have important ideas which are not always easy to explain or understand. However, the concept attainment model is easy to use in any curriculum area. There are six examples on the following pages:

- **Example 1** – Mathematics – Flat faced shapes and curved faced shapes (see below)
- **Example 2** – Health and physical education: Teamwork and cooperation (pages 36-37)
- **Example 3** – Science – Photosynthesis: Where does the mass of a plant come from? (pages 38-39)
- **Example 4** – Geography: Regions (page 41)
- **Example 5** – English: Modal verbs (page 41)
- **Example 6** – Economics lesson: demand and supply (page 41).

In each instance, the Exemplars are mostly based on 'word' activities, but the model is easy to adapt for photos, cartoons, artefacts, and shapes.



EXAMPLE 1 – MATHEMATICS: FLAT FACED SHAPES AND CURVED FACED SHAPES

This worked example follows the three phases of the concept attainment model (see page 32). The example uses the concept attainment model to assist early years students to understand the concept of flat and curved surface shapes.

Materials

This example uses models and items of various sizes and shapes which have flat and curved faces.

PHASE 1: PRESENT DATA AND IDENTIFY THE CONCEPT

The teacher takes to the class 12-15 models of flat faced shapes and 12-15 models of curved faced shapes. (This worked example assumes you have 12 models, noting that 15 is ideal.) All shapes are three-dimensional.

You will have a stock of standard models for teaching about flat and curved faced shapes. You can add items displaying key attributes of these shapes. For example:

- flat faced shapes could include Lego blocks, book of various sizes and a pair of dice
- curved faced shapes could include a drum, kitchen colander and basketball.

Start the concept attainment session by placing one flat faced shape on a table and telling the class the shape is on the Positive Exemplar table. Place one of the curved faced shapes on another table and tell the class the shape is on the Negative Exemplar table.

Now add another shape to each table. Allow time for students to consider these new Exemplars before adding a third shape to each table.
Continue until each table has 9 shapes.

Now ask your students to think about what the shapes on the Positive Exemplar table have in common. Then invite them to share their guesses about the attributes the Positive Exemplar shapes have in common.

You now have three remaining Positive Exemplars and three remaining Negative Exemplars. Presents the remaining shapes to the class one by one and ask your students to vote for the table on which each shape should be placed. You can use a variety of voting formats such as raising hands or asking students to gather in three groups according to whether the shape is a Positive Exemplar, a Negative Exemplar, or whether they are undecided.

Once the class mostly appears to have come to agreement on the organising concept, ask students to discuss, in pairs, what they think are the defining features of the items on the Positive Exemplar table. During this discussion they are refining their hypotheses.

Now ask your students to individually write down their hypothesis, or draw two Positive Exemplars of their own. You will need to match this important step of recording their own hypotheses with their writing capabilities. Some students may be able to produce both a written statement and a set of drawings. Some may find a set of drawings demanding enough.

PHASE 2: TEST ATTAINMENT OF THE CONCEPT

Open Phase 2 of the lesson by asking students to report on the outcomes of their discussion and to share their own hypotheses. Each time a correct hypothesis is offered you confirm it.

Then you name the concept of flat faced shapes and describe the key attributes of those shapes by referring to the items on the Positive Exemplar table.

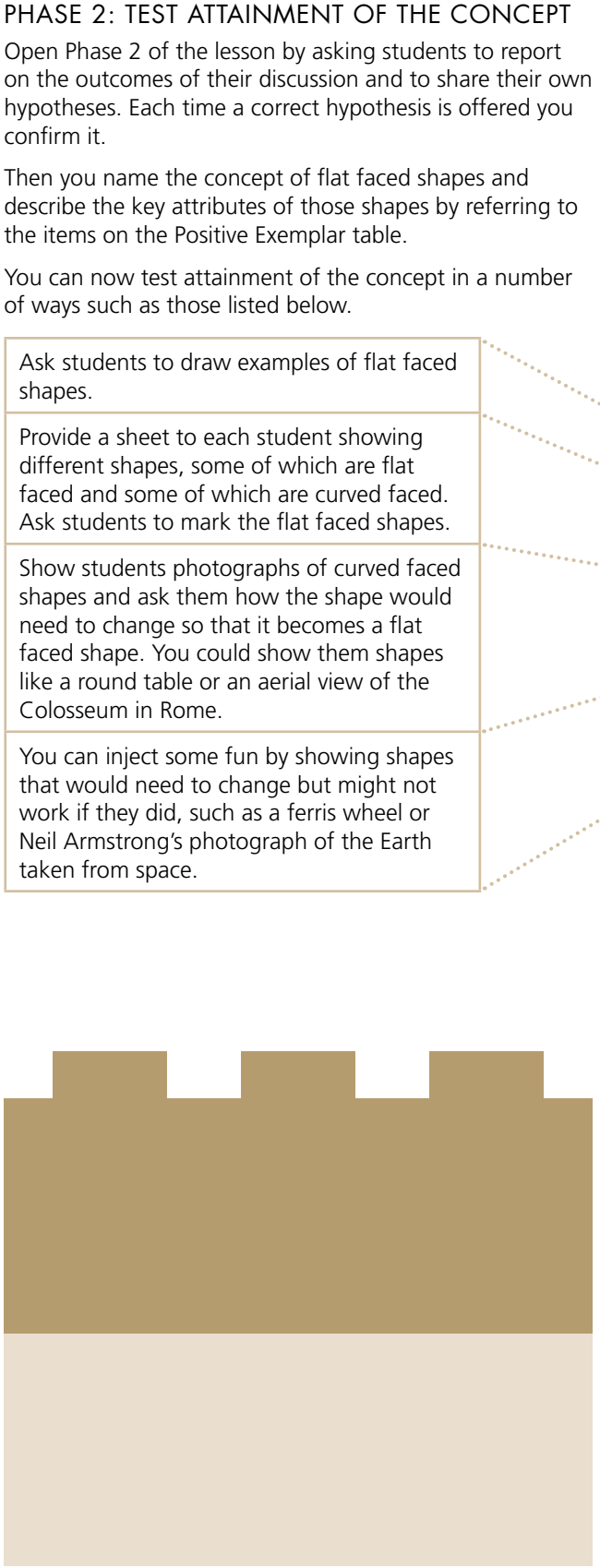
You can now test attainment of the concept in a number of ways such as those listed below.

Ask students to draw examples of flat faced shapes.
Provide a sheet to each student showing different shapes, some of which are flat faced and some of which are curved faced. Ask students to mark the flat faced shapes.
Show students photographs of curved faced shapes and ask them how the shape would need to change so that it becomes a flat faced shape. You could show them shapes like a round table or an aerial view of the Colosseum in Rome.
You can inject some fun by showing shapes that would need to change but might not work if they did, such as a ferris wheel or Neil Armstrong's photograph of the Earth taken from space.

PHASE 3: ANALYSE THINKING STRATEGIES

To foster students' analysis of their own thinking, lead them in a discussion of how their thinking evolved during the course of the task. You could ask questions like these:

- did you start by looking at one attribute of the shapes?
- if your original hypothesis was disconfirmed, what happened to your thinking?
- did you shift your focus to other attributes of the shapes on the Positive Exemplar and Negative Exemplar tables?
- what aspects of the lesson will help you remember the concept of flat faced three-dimensional shapes in future?



EXAMPLE 2 – HEALTH AND PHYSICAL EDUCATION: TEAMWORK AND COOPERATION

This example uses the concept attainment model to assist middle years students to understand the concept of 'teamwork and cooperation'. Understanding the concept helps students to develop and incorporate teamwork and cooperation in their own behaviour, and to identify and support development of teamwork and cooperation in the behaviour of others.

1

PHASE 1: PRESENT DATA AND IDENTIFY THE CONCEPT

After working through these pairs with students, the teacher asks students to write down why, in their individual opinion, the Positive Exemplars belong with each other – what attributes do they have in common? Their writing represents an attempt at a concept or hypothesis.

PAIRS OF EXEMPLARS PRESENTED TOGETHER	
Positive Exemplars	**Negative Exemplars**
Classmates share ideas with each other and listen to each other about how to be successful at task or skill during the activity/game.	Classmates yell at each other about what they did or did not do to be successful at the task or skill during the activity/game. Classmates ignore what other students share.
Classmates cheer on each other and themselves during the activity/game.	Classmates criticise each other and themselves during the activity/game.
Classmates involve each other and themselves in the activity/game.	Classmates exclude other classmates or themselves during the activity/game.
Classmates assure that everyone gets equal chances to perform tasks and skills during the activity/game.	One or two classmates perform most of the tasks or skills during the activity/game. Some classmates keep others from participating.
Classmates offer assistance to each other during the activity/game.	Classmates do not assist each other during the activity/game.
Classmates work hard and recognise their classmates' hard work.	Classmates do not work hard and give no recognition to their classmates' hard work.
Classmates follow the rules or procedures of the activity/game.	Classmates ignore the rules or procedures of the activity/game, or cheat.
Classmates work together to identify obstacles to success, develop actions to overcome the obstacles, and then do the actions together.	Classmates do not work together, ignore obstacles to success, and do not take actions to overcome the obstacles together.
Classmates control their own emotions and behaviour during the activity/game.	Classmates display anger toward others and themselves, and behave aggressively during the activity/game.

PHASE 2: TEST ATTAINMENT OF THE CONCEPT

The teacher then presents more pairs and ask students if these pairs fit their concepts, or hypotheses. Students are asked to rewrite their concept if the pairs do not fit.

ADDITIONAL EXEMPLARS PRESENTED TOGETHER	
Positive Exemplars	**Negative Exemplars**
Classmates communicate respectfully with each other.	Classmates communicate with each other in a disrespectful manner.
Classmates encourage themselves and each other.	Classmates discourage themselves and each other.
Classmates participate with any and all classmates.	Classmates participate only with classmates they are comfortable with and choose.
Classmates take turns.	Some classmates do not take turns.
Classmates help each other.	Classmates do not help each other.
Classmates give their best effort and recognise their classmates' effort.	Classmates don't give their best effort and don't recognise their classmates' hard work.
Classmates solve problems together.	Classmates make no or few attempts to solve problems together.
Classmates self-manage emotions and behaviour.	Classmates do not self-manage emotions and behaviour.
Classmates control their own emotions and behaviour during the activity/game.	Classmates display anger toward others and themselves, and behave aggressively during the activity/game.

The teacher now presents four attributes individually and asks students to place them in Positive Exemplar column or the Negative Exemplar column.

Exemplars presented individually which students vote on to decide whether it is a Positive or Negative Exemplar
Some classmates do as little as possible during the activity/game
Classmates build on other classmates' strengths during the activity/game
Classmates give each other praise for how hard they try during the activity
Classmates yell and scream directions at one other classmate in their group.

Students then generate examples of Positive Exemplars and Negative Exemplars, such as these. Exemplars generated by students might include the following.

Positive Exemplars generated by students	**Negative Exemplars generated by students**
When someone makes a mistake we help them by explaining what went wrong	When someone makes a mistake we laugh at them
If you're good at a game/activity you help others to be good at it too	We don't include classmates if they're not very good at the activity
Everyone congratulates each other for being involved in a good game/activity	People who win a game/activity act as though they are better than the other team

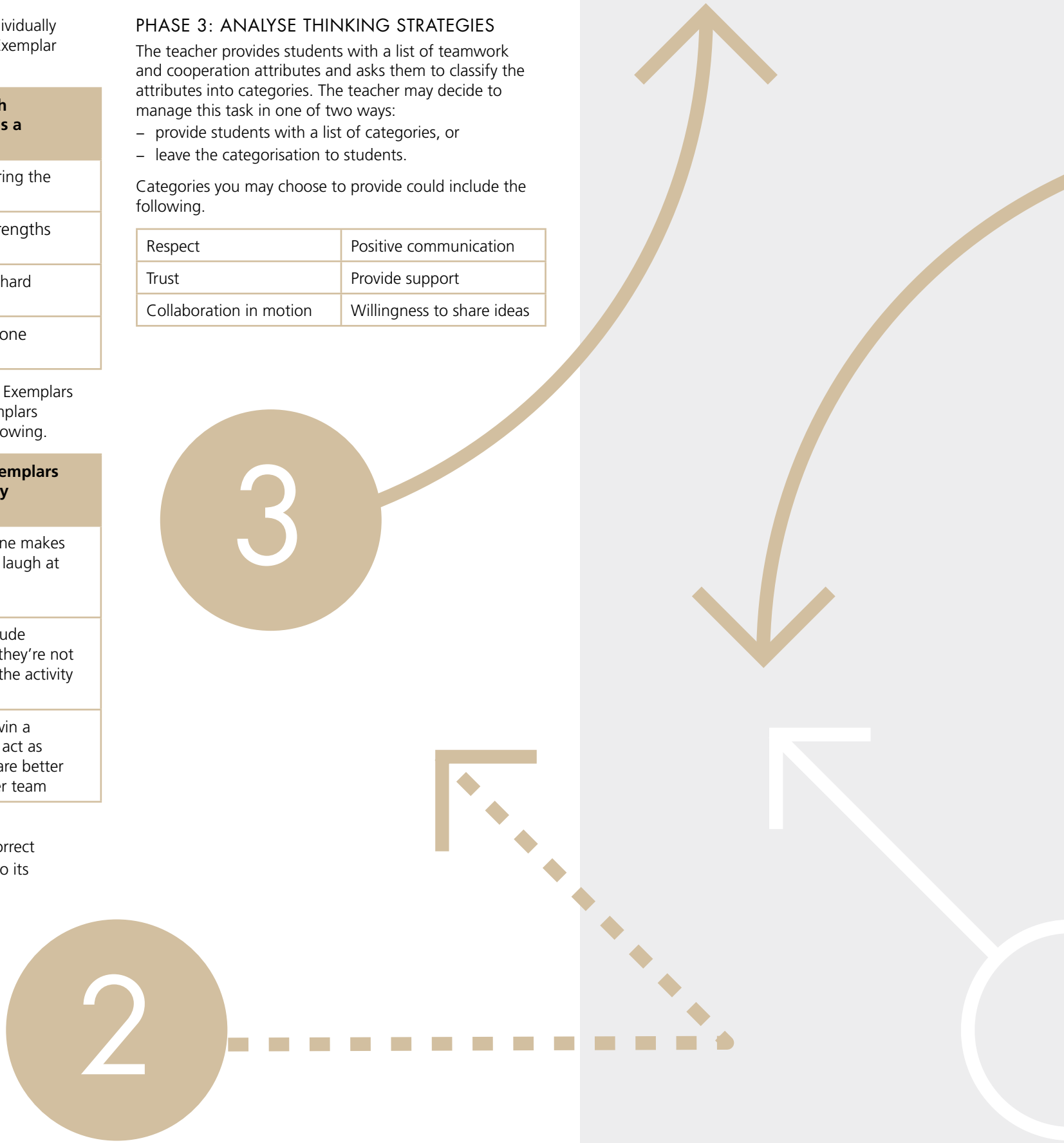
At this point the teacher:
- confirms which student hypotheses are correct
- states the concept's definition according to its essential attributes.

PHASE 3: ANALYSE THINKING STRATEGIES

The teacher provides students with a list of teamwork and cooperation attributes and asks them to classify the attributes into categories. The teacher may decide to manage this task in one of two ways:
- provide students with a list of categories, or
- leave the categorisation to students.

Categories you may choose to provide could include the following.

Respect	Positive communication
Trust	Provide support
Collaboration in motion	Willingness to share ideas



EXAMPLE 3 – PHOTOSYNTHESIS: WHERE DOES THE MASS OF A PLANT COME FROM?

This worked example follows the three phases of the concept attainment model (see page 32). The example uses the concept attainment model to assist middle years students to understand the concept that plants gain mass when they combine carbon dioxide with water to make an organic carbon in the form of glucose through a process called photosynthesis.

PHASE 1: PRESENT DATA AND IDENTIFY THE CONCEPT

The concept of photosynthesis is commonly misunderstood. After students have a basic understanding of the process of photosynthesis, they are shown Positive Exemplars of the complementary process of respiration, paired with Negative Exemplars comprising common misconceptions about photosynthesis.

To begin, the teacher gives groups of 3-4 students a copy of the first four pairs of Exemplars.

PAIRS OF EXEMPLARS PRESENTED TOGETHER

Positive Exemplars	Negative Exemplars
Carbon dioxide (gas) is converted to organic carbon (solid) in a plant	Organic carbon (solid) is converted to carbon dioxide in plants and other organisms
Energy from sunlight changes carbon dioxide and water into glucose, an organic carbon	Glucose in organisms is a source of chemical energy that is broken down into water and oxygen
The only way for plants to get food is to make it from water and air	The only way for plants to get food is to make it from the sun and nutrients in the soil
Sunlight is the energy needed to combine low-energy molecules (carbon dioxide and water) to make higher-energy organic carbon molecules of glucose	When higher-energy molecules break down, they release energy and create low-energy molecules

Students read the Positive Exemplars and Negative Exemplars, comparing them and marking key words. They then write down the common idea linking the Positive Exemplars – their hypothesis about the concept.

At this point you can ask students to discuss their hypothesis. After this discussion, students can revise their individual hypothesis and share it with the class.

Next, small groups receive another four pairs of Exemplars to discuss.

ADDITIONAL EXEMPLARS PRESENTED TOGETHER

Positive Exemplars	Negative Exemplars
A plant's mass increases as more glucose is made	A plant's mass decreases as glucose is used
Plants grow and build mass through photosynthesis	Plants grow and build mass from water and the sun
Carbon dioxide + water ➔ (reaction caused by sun's energy) ➔ glucose + oxygen	Glucose + oxygen ➔ (reaction caused by sun's energy) ➔ carbon dioxide + water + energy
The weight of a plant increases when carbon dioxide (gas) is absorbed	The weight of a plant increases when water is absorbed through the roots

After reading and discussing them, students go back to their individual hypotheses to edit as needed.

As a full class, the teacher can lead a discussion about any changes they made to their hypotheses and the evidence in Exemplars that inspired the changes.

PHASE 2: TEST ATTAINMENT OF THE CONCEPT

To test their hypotheses, a final set of Positive and Negative Exemplars is presented to the whole class, one at a time in random order.

Exemplars presented individually which students vote on to decide whether it is a Positive or Negative Exemplar
$CO_2 + H_2O$ ➔ (reaction caused by sun's energy) ➔ $C_6H_{12}O_6 + O_2$
$C_6H_{12}O_6 + O_2$ ➔ (reaction caused by sun's energy) ➔ $CO_2 + H_2O$ + energy (ATP)
Soil nutrients are an essential part of this photosynthesis
A gas is an essential part of this process
Water and carbon dioxide are the source of the plant's growth in mass
Water and soil nutrients are the source of the plant's growth in mass
The availability of water and carbon dioxide will affect the growth of a seed into a tree
Soil nutrients are essential for a seed to grow into a flower

As a formative assessment, students give a thumbs up if they think the description supports their hypothesis, and a thumbs down if they feel the description does not fit.

Give students a third opportunity to edit their concept definitions. Again, invite students to and share their hypotheses with the whole class.

Now the teacher presents the actual concept of photosynthesis for students to compare with their own. This is followed by a discussion about the supporting evidence for the concept in the Exemplars.

Students then generate examples of Positive Exemplars using the following prompts:

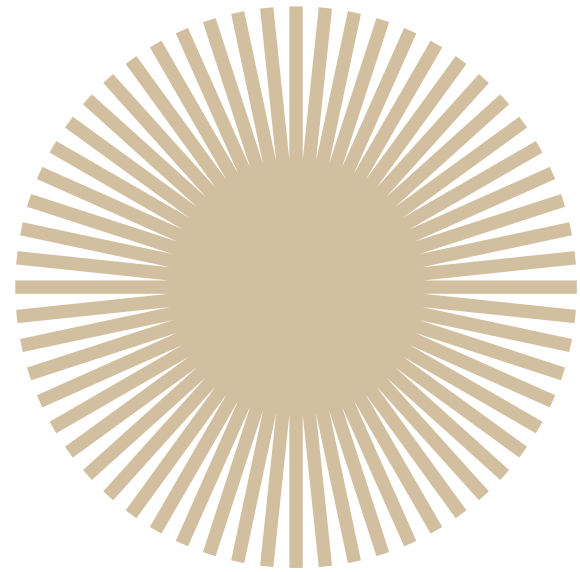
- day and night
- drought
- leaves and roots
- glucose.

PHASE 3: ANALYSE THINKING STRATEGIES

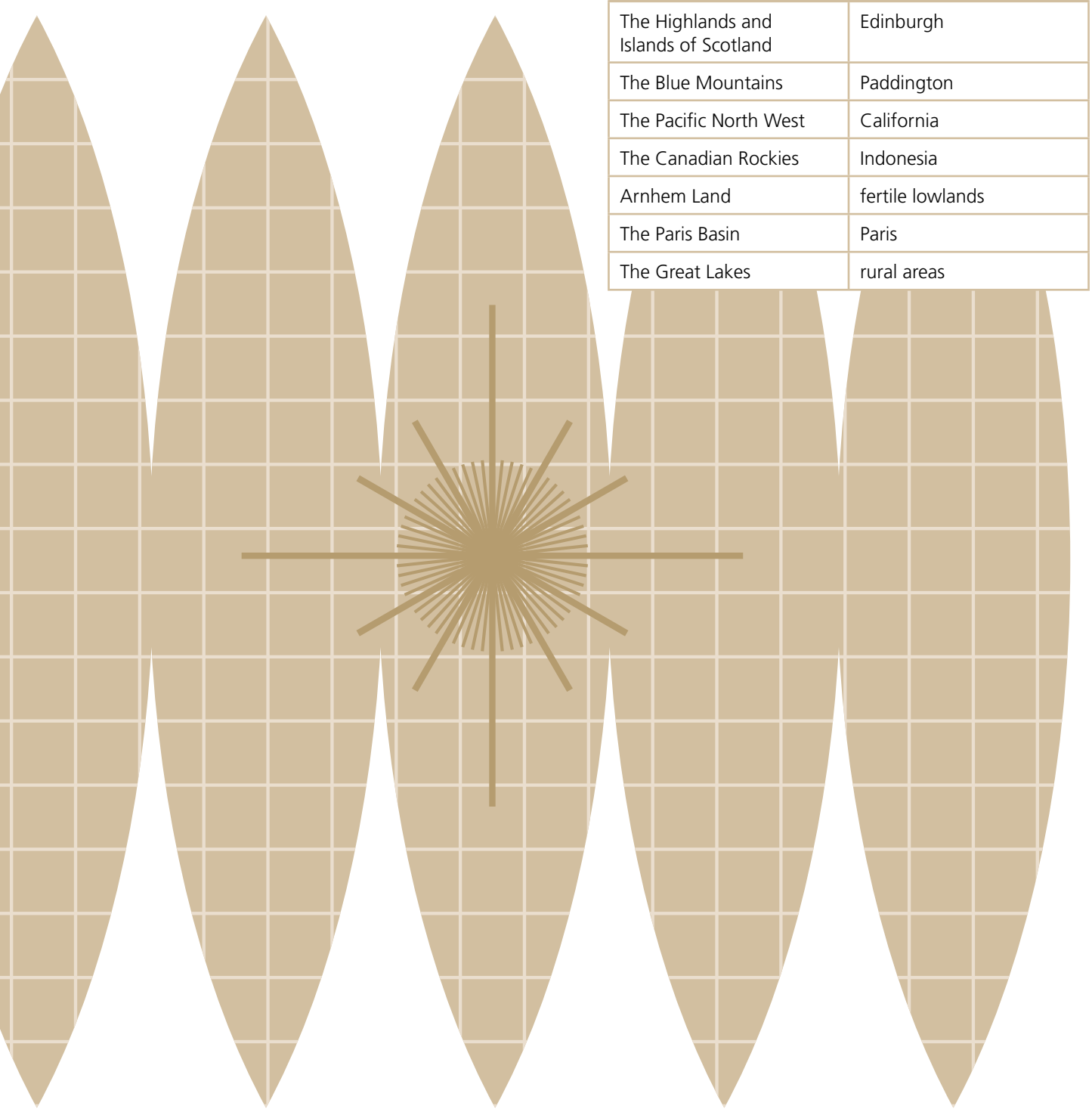
To provide an opportunity to understand the learning process, students revisit the Exemplars individually, and then in small groups determine which two or three were most helpful in developing their concept definition.

In discussion and writing they can consider the following questions:

- Why were those 2-3 descriptions most helpful in identifying the concept?
- How many descriptions were needed before they were able to write an accurate definition?
- Which, if any, were not needed?
- What, if any, additional descriptions would have been helpful?



The three examples on this page simply demonstrate the adaptability of the concept attainment teaching model. It can be used across the curriculum.



EXAMPLE 4 – GEOGRAPHY: REGIONS

These positive and negative exemplars were used in a geography lesson to illustrate the concept of 'the region'.

Positive Exemplars	Negative Exemplars
The Highlands and Islands of Scotland	Edinburgh
The Blue Mountains	Paddington
The Pacific North West	California
The Canadian Rockies	Indonesia
Arnhem Land	fertile lowlands
The Paris Basin	Paris
The Great Lakes	rural areas

EXAMPLE 5 – ENGLISH: MODAL VERBS

This brief example of the concept attainment model in action assisted students to understand the concept of modal verbs, and their use in writing.

Present the following pairs of Exemplars to the class – Positive Exemplars appear in the 'Yes' column and Negative Exemplars appear in the 'No' column.

Positive Exemplars	Negative Exemplars
I must go and eat some cake.	I baked a cake.
I could run faster.	I won the race.
I ought to have finished my homework.	I wrote two pages for my homework.
I should pack my bag the night before.	I never pack my bag.

Provide a list of modal verbs to the class.

can	could	had better
have to	have got to	may
might	must	ought to
shall	should	Will
would		

Set the students a task to respond to the following letter using modal verbs.

Dear Neylan

I have recently started at a new school and there is a boy in my form who is bullying another student. He calls her names and has even hurt her. She gets very upset.

What should I do?

From Pat

Before writing their reply students may benefit from reviewing a model response like this.

Dear Pat

You are right to be concerned about this and should definitely do something to help your classmate. My advice would be to tell a member of staff at your school.

You could also talk to the student so that they feel there are friends that they can talk to.

If you are worried about this, you might also want to speak to your parents.

You could also pass on the number of Childline who can give confidential advice.

Yours sincerely

Neylan

EXAMPLE 6 – ECONOMICS LESSON: DEMAND AND SUPPLY

PHASE 1

As the description for Phase 1 indicates (page 32), the teacher presents 20 pairs of attributes illustrating Positive and Negative Exemplars of demand and supply. After two or three pairs the teacher asks each student to write down why Positive Exemplars belong together – what attributes do they have in common? Their writing represents their attempt at a concept, or hypothesis.

The teacher presents a few more pairs and asks students if they fit their concept. If they do not fit, ask students to rewrite their concept.

PHASE 2

Now the teacher presents some Exemplars individually and asks students to place them in the Positive Exemplar or the Negative Exemplar column by asking the whole class to vote:

- How many of you would put this in the positive column?
- How many of you would put this in the negative column?

After voting on several attributes the class gets to the point where all or most students agreeing on whether an Exemplar is positive or negative. When this point is reached ask students to discuss in pairs what they think the concept is.

The teacher asks students about their ideas on the nature of the concept and confirms their views by restating the definition, using the first few examples in the positive column. Following this, the teacher chooses an attribute in the Negative Exemplar column and asks students to rewrite it so it fits in the Positive Exemplar column. Students can also be asked generate other positive attributes for the concept.

PHASE 3

Prompt whole class discussion about how the idea of demand and supply emerged in their minds:

- What kind of thinking strategies did they use as they worked towards a attaining the concept?
- How are those thinking strategies useful for learning in general?

PEER COACHING GUIDE: LEARNING TO EXPLORE CONCEPTS

The Peer Coaching Guide is designed to assist peer coaching of the concept attainment model of learning and teaching.

When planning a lesson, the teaching peer can work through the Guide and complete the 'Teacher' items. The items guide you through the model.

The peer observer uses the Guide to familiarise themselves with the plans of the teaching peer and to make notes about what is observed.

The role of peer observers is to observe students during a lesson and to provide feedback about student learning. By observing the whole process in a class you gain ideas for your own teaching. The teaching peer is the coach who is demonstrating a teaching episode for you. When you teach and are observed, you become the coach.

PEER COACHING GUIDE: PART 1 – PREPARATION FOR OBSERVATION

QUESTION FOR THE TEACHING PEER TO COMPLETE	
Do you want to suggest a focus for the analysis? If so, what is it?	

The teaching process

Most lessons have both content and process objectives:

- content objectives identify subject matter (facts, concepts, generalisations, relationships) to be mastered by students
- process objectives specify skills and procedures students need if they are to learn productively from the cognitive and social tasks of the concept attainment model.

QUESTIONS FOR THE TEACHING PEER TO COMPLETE		
Content objectives	What concept is the objective of the lesson?	
	What are its defining attributes?	
	What kind of data will you present to the students?	
	Is the information or concept new to the students?	
Process objectives	Are the students familiar with the concept attainment model of learning?	
	Do they need special assistance or training with respect to any aspect of the process?	

Focus statement

The focus defines the field of search for the students. It may eliminate irrelevant lines of inquiry. Often it is pitched at a level of abstraction just above the Exemplars – for example, 'a literary device' might serve as a focus for the concept of metaphor.

QUESTION FOR THE TEACHING PEER TO COMPLETE	
Write the focus statement here.	

PHASE 1: PRESENT DATA AND IDENTIFY THE CONCEPT

The data set of Exemplars is planned in pairs of Positive and Negative Exemplars. They are ordered to enable the students – by comparing the Positive Exemplars and contrasting them with the Negative Exemplars – to distinguish the defining attributes of the concept.

Exemplars come in many forms, such as diagrams, words, phrases, documents, three-dimensional models and maps. You are asked to describe them below. A description might follow this format:

– The Exemplars are reproductions of nineteenth-century paintings. Half of them are from the Impressionists (Renoir, Monet, Degas). Half are realistic, romantic, or abstract paintings.

QUESTION FOR THE TEACHING PEER TO COMPLETE	
Describe the nature of the Exemplars.	

As students work through the data set, they examine each Exemplar and develop hypotheses about the concept. They need to ask themselves what attributes the Positive Exemplars have in common. It is those attributes that define the concept. You need to get information about whether the students are formulating and testing ideas.

QUESTION FOR THE TEACHING PEER TO COMPLETE	
How will you organise and manage: – the examination? – development of hypotheses? How will you go about collecting information about whether students are formulating and testing idea?	

PHASE 2: TEST ATTAINMENT OF THE CONCEPT

Naming and applying the concept

Once concepts are agreed on (or different ones justified), they need names. After students have generated names, the teacher may need to supply the technical or common term – for example: We call this style 'Impressionism'.

Application requires students to determine whether further Exemplars fit the concept and, perhaps, find examples of their own.

QUESTIONS FOR THE TEACHING PEER TO COMPLETE	
Is there a technical or common term the students need to know?	
How will you provide further experience with the concept?	

PHASE 3: ANALYSE THINKING STRATEGIES

When students have developed hypotheses they are fairly sure of, you will ask them to describe the progression of their thinking and the concept they have arrived at.

When to embark on Phase 3 is a matter of judgement. How will you decide, what will you say, and what questions will you ask to assist students to analyse their thinking strategies?

QUESTION FOR THE TEACHING PEER TO COMPLETE	
How will you decide when to do this and what will you say? What questions will you ask students to guide their analysis?	

An assignment to follow the lesson often involves applying the concept to fresh material. For example, if the concept of *metaphor* is introduced, students might be asked to read a literary passage and identify the uses of metaphor in it.

QUESTION FOR THE TEACHING PEER TO COMPLETE	
Are you planning such an assignment? If so, please describe it briefly.	

PEER COACHING GUIDE:
PART 2 – OBSERVATION CHECKLIST

As the peer observer, familiarise yourself with the plan set out in Part 1.

During the teaching episode:

– concentrate on the behaviour of students

– comment on their performance.

Focus statement

QUESTIONS FOR THE OBSERVING PEER TO COMPLETE	
Did your teaching peer deliver the focus statement?	
Was it clear to the students?	
Did it function to help them focus on the central content of the lesson – completely, partially, or not at all?	

PHASE 1: PRESENT DATA AND IDENTIFY THE CONCEPT

The dataset

QUESTIONS FOR THE OBSERVING PEER TO COMPLETE	
Were approximately equal numbers of Positive and Negative Exemplars presented?	
Were the early Positive Exemplars clear and unambiguous?	
Did the data set contain sufficient Positive and Negative Exemplars?	
Was the set presented as: – a labelled pair at a time? – all at once, with labels following? – Other? (Please describe.)	
Did the teaching peer provide labels for the first eight or ten pairs before asking the students to suggest a label?	

PHASE 2: TESTING ATTAINMENT OF THE CONCEPT

QUESTIONS FOR THE OBSERVING PEER TO COMPLETE	
Were students asked to generate hypotheses? Were they asked to share them or avoid sharing them?	
Were the students asked to record their thinking as the episode progressed?	

Naming and applying the concept

QUESTIONS FOR THE OBSERVING PEER TO COMPLETE	
Were the students able to name the concept?	
Was a technical or common term for the concept supplied (if needed)?	
Were additional Exemplars provided?	
Were the students asked to supply their own Exemplars?	
As students examined new material, supplying their own Exemplars, did they appear to know the concept?	

PHASE 3: ANALYSE THINKING STRATEGIES

QUESTIONS FOR THE OBSERVING PEER TO COMPLETE	
Did the teacher ask the students to share their thinking?	
Were students able to express their hypotheses?	
If there were differing hypotheses, could students justify or reconcile them?	

PEER COACHING GUIDE: DISCUSSION

Comments on student training needs

To improve student performance, the first question to explore is whether it will improve with practice. Simple repetition of the concept attainment model gives students a chance to learn to respond more appropriately.

The second question to explore is how we might directly teach students the skills they need to manage the cognitive and social tasks of the concept attainment model.

Discuss how students responded to Phase One

- Did students pay close attention to the focus statement?
- Did they apply the focus statement when they examined the Exemplars?
- If not, is it worthwhile to give specific instruction and what might that be?

Discuss how students responded to Phase Two

- Did students compare and contrast the Exemplars?
- Did they make hypotheses with the expectation that they might have to change them?
- Did they use the Negative Exemplars to eliminate alternatives?
- Is it worthwhile to provide specific training, and what might that be?

Discuss how students responded to Phase Three

- Were students able to debrief their thinking?
- Were they able to see how different lines of thinking gave similar or different results?
- Were they able to generate labels that express the concept?
- Do they understand how to seek Exemplars on their own and apply what they have learned?
- Is it worthwhile to provide specific training, and what might that be?

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ABOUT THE AUTHOR

Professor David Hopkins

Among many educational roles David has served as Chief Adviser to three UK Secretaries of State, Dean of Education at the University of Nottingham, an Outward Bound Instructor and an International Mountain Guide. With Wayne Craig, David led the Powerful Learning school improvement initiative in the northern suburbs of Melbourne, Australia. David is Emeritus Professor at London's Institute of Education, and founded the Adventure Learning Schools Charity. In 2013 he completed his school improvement trilogy with the publication of *Exploding the Myths of School Reform* (ACER Press).

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